Coal Age

A McGRAW-HILL PUBLICATION

APRIL, 1948

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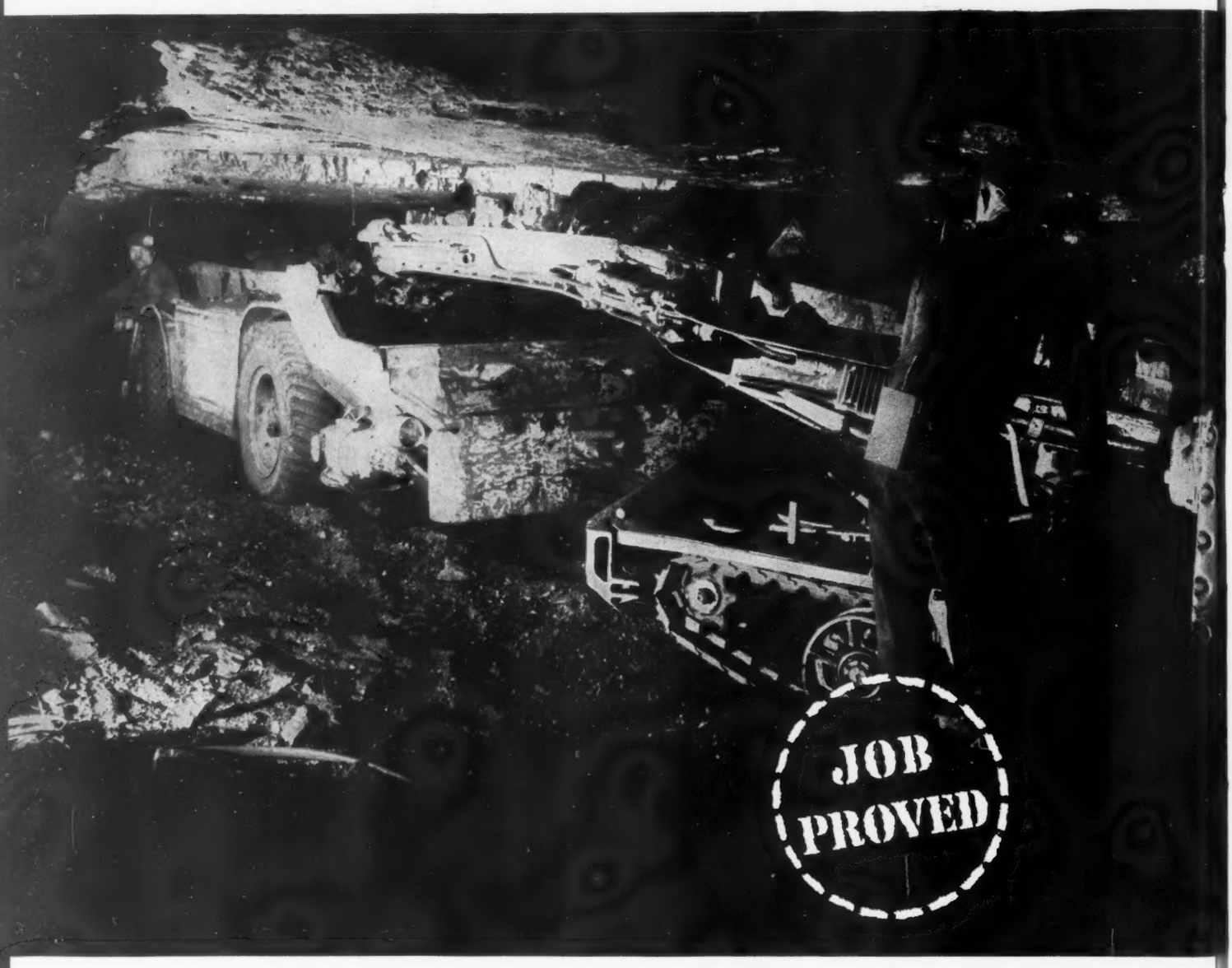
PENSIONS OR POWER? ..p. 74

Increases Production . . . Saves $1664 a Year



SUN MINE LUBRICANT . . .

Eliminates Shutdowns Every Other Day for Cleaning and Lubricating Loading Machine

A big Pennsylvania mine was shutting down a loading machine every two or three days because grease was separating and forming gummy deposits in the transmission case and heads.

A Sun Engineer recommended they switch to a "Job-Proved" Sun grease that is used in many coal mines under similar operating conditions.

This grease maintains its consistency despite bad water conditions. Since they began using it in this mine, they have had to grease the loader only once every two or three weeks.

Estimated saving is $1664 a year on labor required for greasing. In addition, about one-sixth as much grease is now used, and more continuous production of coal has resulted.

From mine face to tipple, Sun "Job-Proved" lubricants mean maximum protection for mine machinery, maximum time on the job, and minimum maintenance costs. Call your nearest Sun office today.

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

In Canada: Sun Oil Company, Ltd.—Toronto and Montreal

SUN

SUNOCO

INDUSTRIAL PRODUCTS

Photo courtesy The Euclid Road Machinery Company

The belt with the book in the seat of its pants

A typical example of B. F. Goodrich product improvement

YOU remember the kid who, knowing he was going to get a spanking, put a book in his pants to take the blows. The B. F. Goodrich conveyor belt in the picture is built that way, for the same reason.

A loader, used in building airports, roads, etc., dumps up to *20 tons a minute* of dirt and heavy gravel onto an inclined conveyor belt which rushes them up into that big earth-mover. No ordinary belt could stand the shock, speed, and cutting. The inventor of the machine called in B. F. Goodrich men, who designed a special belt, using the same shock absorption principle as the lad with the book in his pants. They put a layer of extra-heavy nylon cords across the belt, just beneath the surface, that cushioned the hard shock of blows that would otherwise be shattering "body blows", right to the body of the belt.

This same B. F. Goodrich belt, (Pat. No. 2,310,818) with the "transverse nylon cord breaker", as it is called, that solved the inventor's problem, is setting new records for long life and trouble-free operation on construction jobs, coal mines, quarries, ore mines and wherever else shock load is common. It is outlasting former belts many times. Your B. F. Goodrich distributor can show you its unique construction and give you prices for your installations.

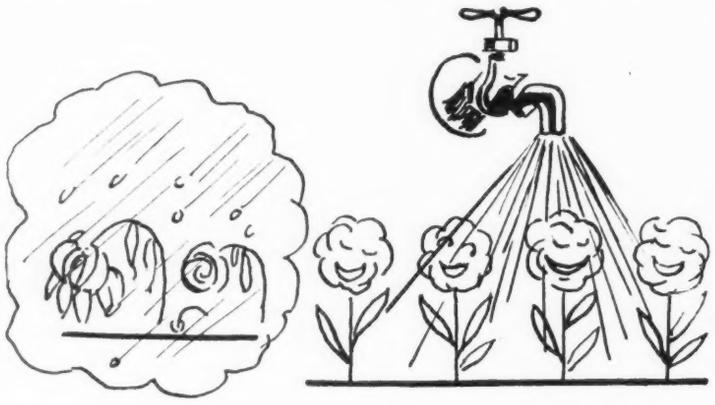
In fact whatever your material handling or power transmission problem, B. F. Goodrich almost certainly has a belt that will solve it and save you money in the process. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich
FIRST IN RUBBER

Make no mistake —

FOR INSTANCE...

Are you mistaken about RAIN WATER?



Make no mistake . . . water from the kitchen faucet is better than rain for the garden! Rain water contains harmful sulphurous acid picked up from atmospheric soot . . . says a prominent Horticulturist.

Coal mining machinery, has to battle with plenty of destructive factors down in the mine. That's why it's so important to use the ONE Lubricant specifically compounded to meet destructive coal mining conditions—i.e. HULBURT QUALITY GREASE—made to do just one thing . . . PROPERLY LUBRICATE coal mining machinery. And make no mistake . . . HULBURT QUALITY GREASE DOES IT!

HULBURT OIL & GREASE COMPANY—PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

— for Coal Mine Lubrication

use

HULBURT

Quality GREASE

PROVEN BY PERFORMANCE

EXTRA SAFETY in every inch
LONGER LIFE with every foot
MAXIMUM LENGTH on every reel

Hazacord TYPE G TWIN PARALLEL MINING MACHINE CABLE

Apply *your* yardstick for judging mining machine cable to Hazacord Twin Parallel, Type G. Here are the facts quickly — and it will pay you to measure them against your own experience with mining machine cable.

CARRIES 25% MORE CURRENT SAFELY. Made with heat-resisting rubber insulation, Hazacord has an operating temperature limit of 75°C as against 60°C for ordinary cables. This better grade insulation gives you an extra factor of safety on overloads and thereby adds to the life of the cable.

FULLY PROTECTED FOR TOUGH SERVICE. Outside jacket is the well known flame-resistant Hazaprene sheath (Penna. Bureau of Mines Approval P-104) . . . that successfully withstands the action of water, acids, oil, abrasion . . . and has proved its unusual ability to stand up in the toughest kinds of service.

EXTRA FLEXIBILITY AND PROTECTION. Okobestoprene Tape, a combination of asbestos fibres and neoprene, is wrapped around the insulated conductor. This new tape increases the flexibility of the assembly and is resistant to moisture, mildew and flame.

MAXIMUM LENGTH ON REEL. Twin Parallel construction gives a space-saving flatness — the dimensions are as small as practicable — permitting maximum footage of cable to be wound on the machine reel.

POSITIVE GROUND CONNECTION. Extra conductor placed between the two power conductors provides a direct, sure ground connection for safer machine operation.

Your nearest Hazard representative will be glad to give you all the facts, records or figures about Hazacord Twin-Parallel Type G Mining Machine Cable you want. Just ask him or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

Substantial Factory Stock Available for immediate shipment. Detailed Stock List sent on request.

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6389

insulated wires and cables for every mining use

Coal Age

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New Company Connection .....

New Title or Position .....

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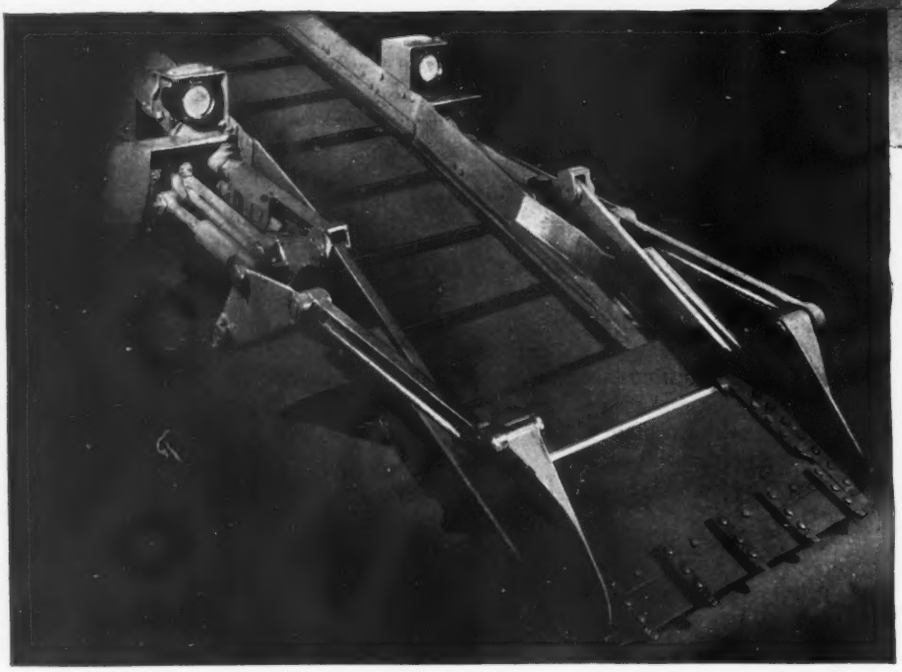
THE SMOOTHEST, MOST DEPENDABLE LOADING ACTION IS THE NATURAL "AUTOMAT" SHOVEL ACTION!



Right you are. Mining men who have used the "Automat" know that the smooth natural shovel action of the Whaley "Automat" has definite advantages for efficient loading of all material, be it coal, rock or slate. First, no matter how fragile the coal, you can load it without degradation. Second, no matter how tough the rock work the "Automat" can handle it just as well as coal. Lifting and loading at the rate of 45 to 50 strokes per minute the "Automat" never fails to clean up quickly and completely any material it may be loading. Furthermore, the "Automat" shovel action means safe loading in close places. For complete loader service, investigate the shovel action and other outstanding features of the Whaley "Automat." Myers-Whaley Co., Knoxville 6, Tennessee.

Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tipple or any lump of rock your cars, aerial tram or larries can take.

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THIS IS THE BIRD

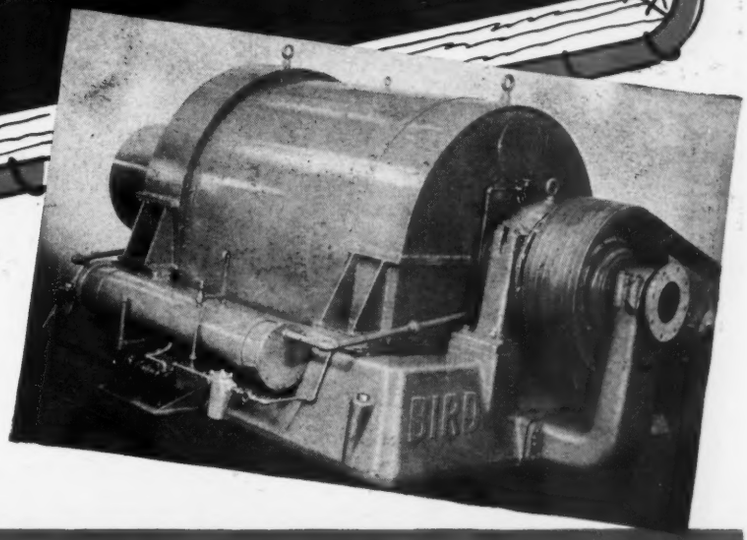
THAT TAKES the water out of your fine coal

THAT DOES the job without drag tanks or other settling devices, handling the fines just as they come from the tables or launders

THAT GETS the water so clean it can be used over and over*

THAT DRIES the coal so dry it's all ready for blending**

THAT HANDLES forty tons or more per hour, continuously, for long periods without parts replacements



*Water contains less than 5% solids in a closed circuited plant. It may be returned directly to the head tank.

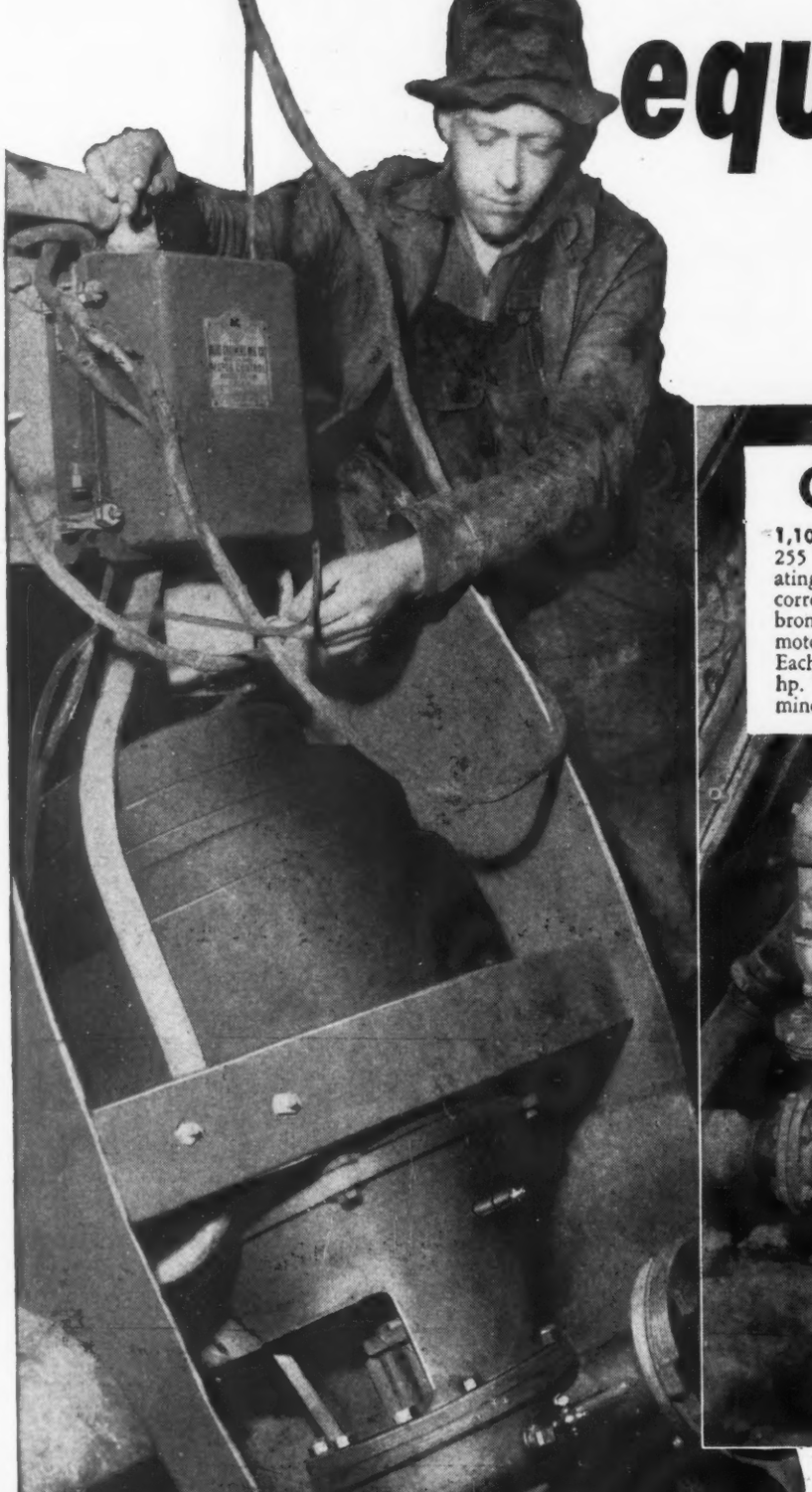
**Coal contains no more than 6 to 10% moisture, the amount depending on the quantity of fines in the feed.

Write for complete information

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Which way do you equipment



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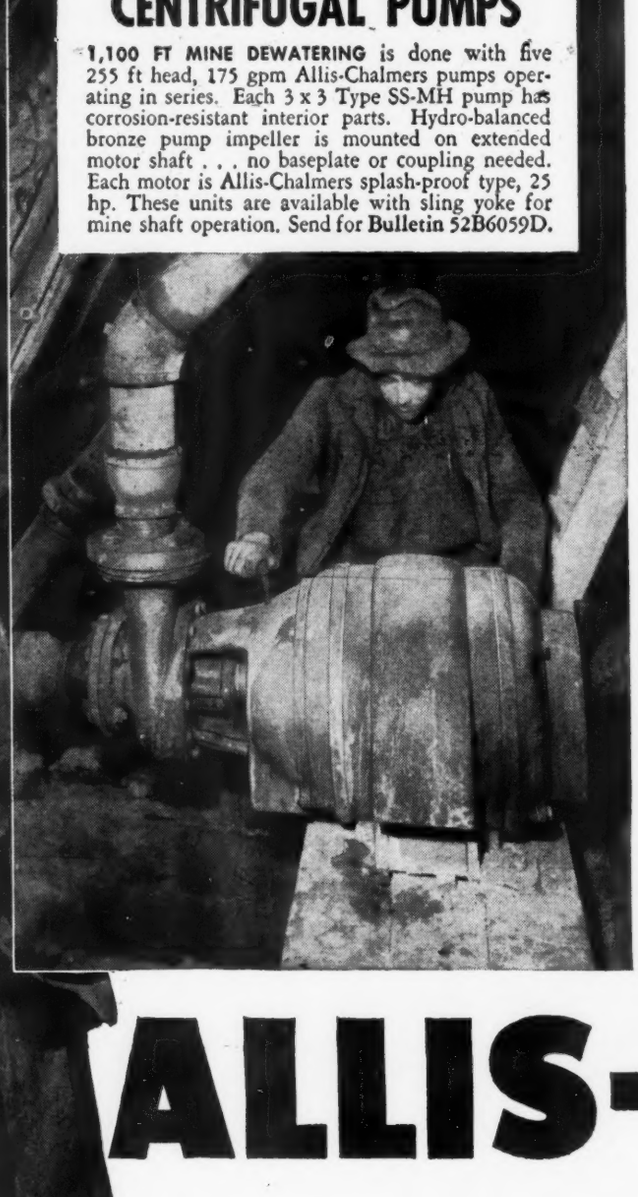
1,100 FT MINE DEWATERING is done with five 255 ft head, 175 gpm Allis-Chalmers pumps operating in series. Each 3 x 3 Type SS-MH pump has corrosion-resistant interior parts. Hydro-balanced bronze pump impeller is mounted on extended motor shaft . . . no baseplate or coupling needed. Each motor is Allis-Chalmers splash-proof type, 25 hp. These units are available with sling yoke for mine shaft operation. Send for **Bulletin 52B6059D.**



ALLIS-

measure costs?

☐ PRICE TAG or

☐ HOW FAST YOUR NEW EQUIPMENT PAYS OFF

WANT TO ADD PROFIT DOLLARS to your operations? Then measure inefficiency loss of your present equipment against pay-off time of new equipment for coal! Surprising *how quickly* modern, cost-cutting equipment will pay for itself in many installations.

When you specify Allis-Chalmers for coal equipment, you're dealing with an experienced *coal industry supplier*. You choose from a broad range of diversified equipment. You get maximum type and size choice, too. That means better *suitability* for your *specific job*. And — you get equipment that's well-known for outstanding durability . . . stays on the job longer!

There's a trained equipment engineer in your locality who can help you get added profit dollars with modern equipment. He's your Allis-Chalmers representative. Call him today. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

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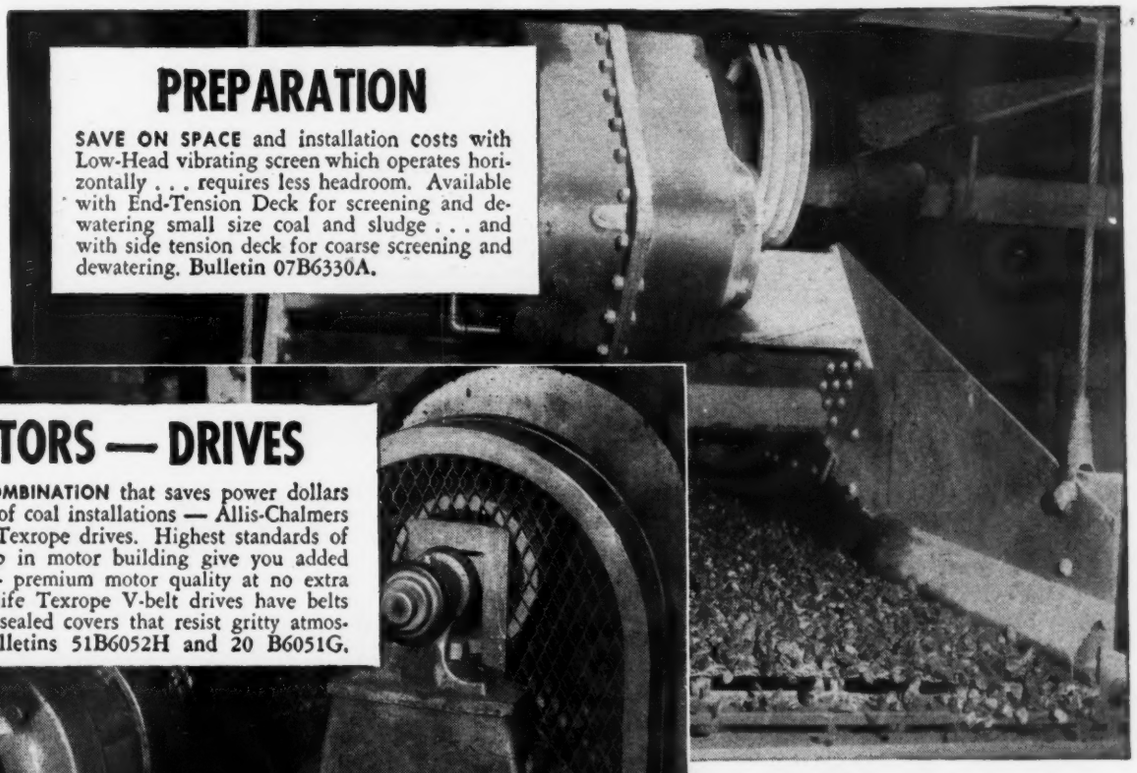

PREPARATION

SAVE ON SPACE and installation costs with Low-Head vibrating screen which operates horizontally . . . requires less headroom. Available with End-Tension Deck for screening and dewatering small size coal and sludge . . . and with side tension deck for coarse screening and dewatering. **Bulletin 07B6330A.**

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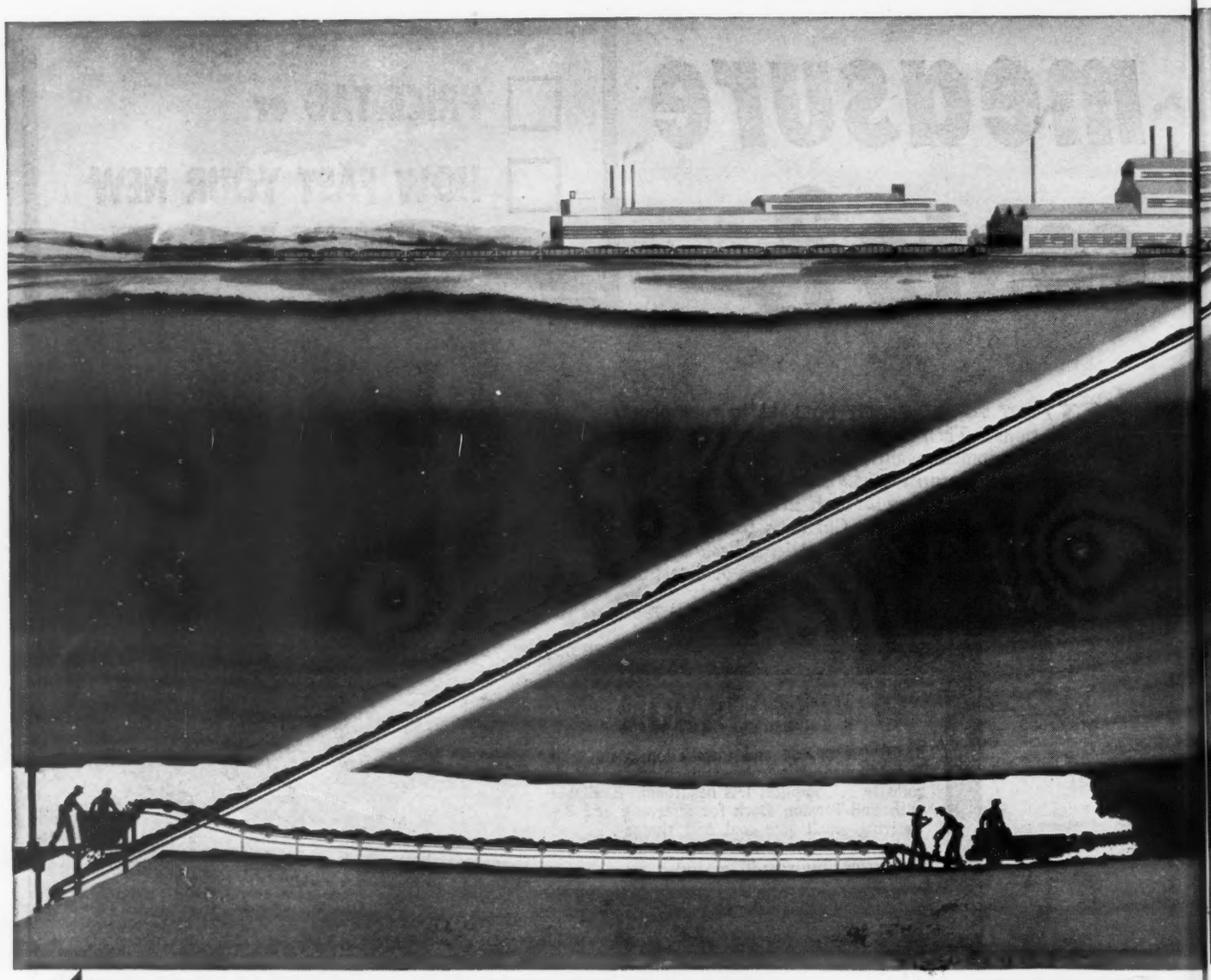
—BUILDS FOR COAL PROGRESS!



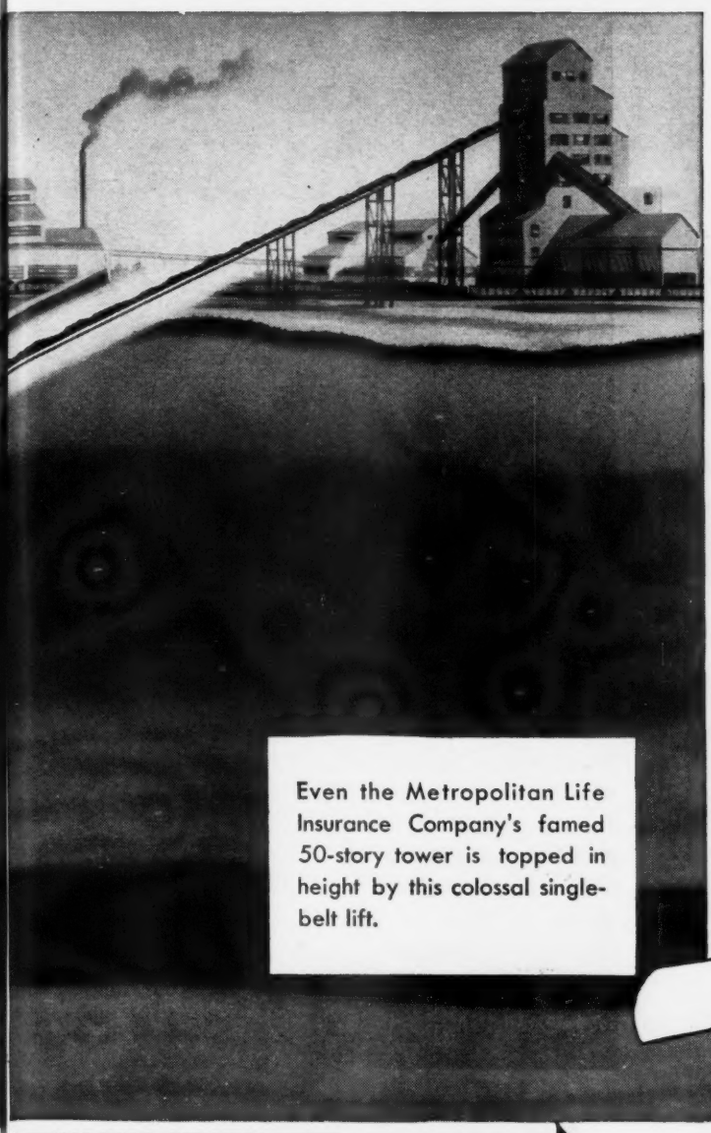
Here's the World's Highest Lift!

THE world's highest single-flight conveyor lift is being installed at a large southern coal mine. It runs from the working level 656 feet below ground to atop the 73-foot tipple — in one continuous flight to a peak of 729 feet.

This record-breaking lift is designed to meet these requirements: A river of coal will flow uphill at the rate of 1,000 tons every hour. It will ride a distance of 2,449 feet in going from bottom to top, thus necessitating a belt nearly a mile long to make the cycle. Total belt pull at the head driving pulley is 62,400 pounds.

The belt assigned to this extraordinary task is a 42-inch-wide Goodyear COMPASS 450 STEEL-CABLE—specified by the G.T.M. —Goodyear Technical Man. In this stout-hearted conveyor the load-carrying body consists of wiry, high-tensile steel cables. They give the belt unparalleled strength without the bulk and stiffness unavoidable in conventional, plied-up, heavy-duty belts. Moreover, the high modulus of this COMPASS assures high dimensional stability that reduces stretch under severe loads over long periods to less than 1%.

Eleven out of 13 of the world's highest lifts are now Goodyear-belted — striking proof of Goodyear's superiority in slope conveyor engineering. Goodyear COMPASS STEEL-CABLE belts are *mine-proved*—many have already carried millions of tons of coal and ore in several years of mine service. To realize the full economy of slope-belt haulage, consult the G.T.M. first. Write: Goodyear, Belting Sales Dept., Akron 16, Ohio.



Even the Metropolitan Life Insurance Company's famed 50-story tower is topped in height by this colossal single-belt lift.

729 FT.

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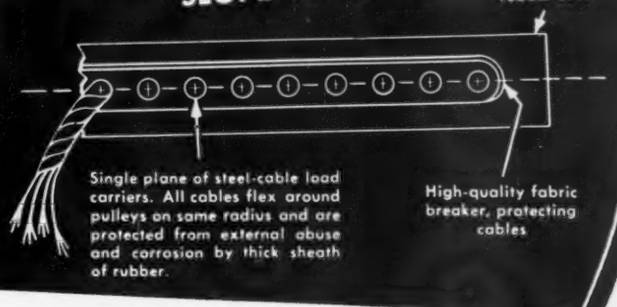
GTM-Specified

COMPASS 450 STEEL CABLE CONVEYOR BELT

for

SLOPE HAULAGE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Single plane of steel-cable load carriers. All cables flex around pulleys on same radius and are protected from external abuse and corrosion by thick sheath of rubber.
High-quality fabric breaker, protecting cables

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STANDARD COAL-FLO—for average distance hauls in main entries, room entries and rooms.

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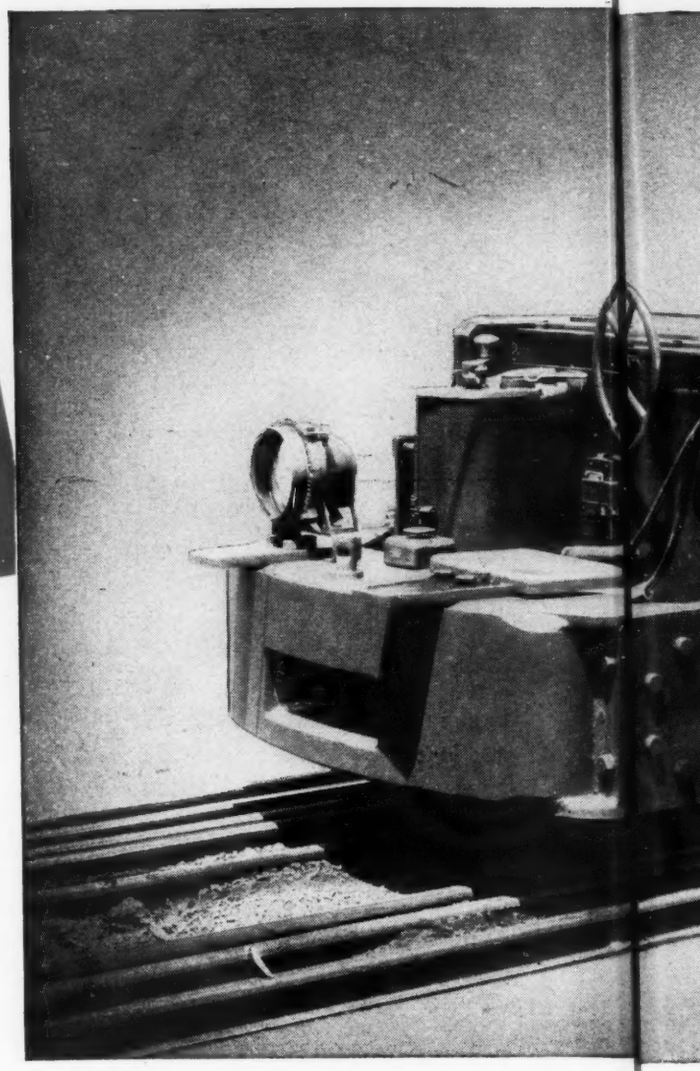
YOU MAKE 4 SAVINGS



When you protect anti-friction bearings with the lubricant that lowers costs, increases production . . . *Texaco Regal Starfak No. 2*

IN locomotives, fans, electric motors . . . wherever grease-lubricated ball and roller bearings are used . . . you'll get better performance, longer bearing life, and lower maintenance costs when you lubricate with *Texaco Regal Starfak No. 2.* You'll save through —

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2. *Lower Replacement Costs* — because, as operators everywhere have discovered, bearings have much longer life when lubricated with *Texaco Regal Starfak No. 2.*

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4. *Higher Productivity Per Machine* — because *Texaco Regal Starfak No. 2* assures smoother, more trouble-free operation . . . reduces down-time.

In low speed, heavy-duty bearings, use *Texaco Marfak* — the famous lubricant that gives lasting protection under the most severe conditions.

For Texaco Lubricants and Engineering Service, just call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write:

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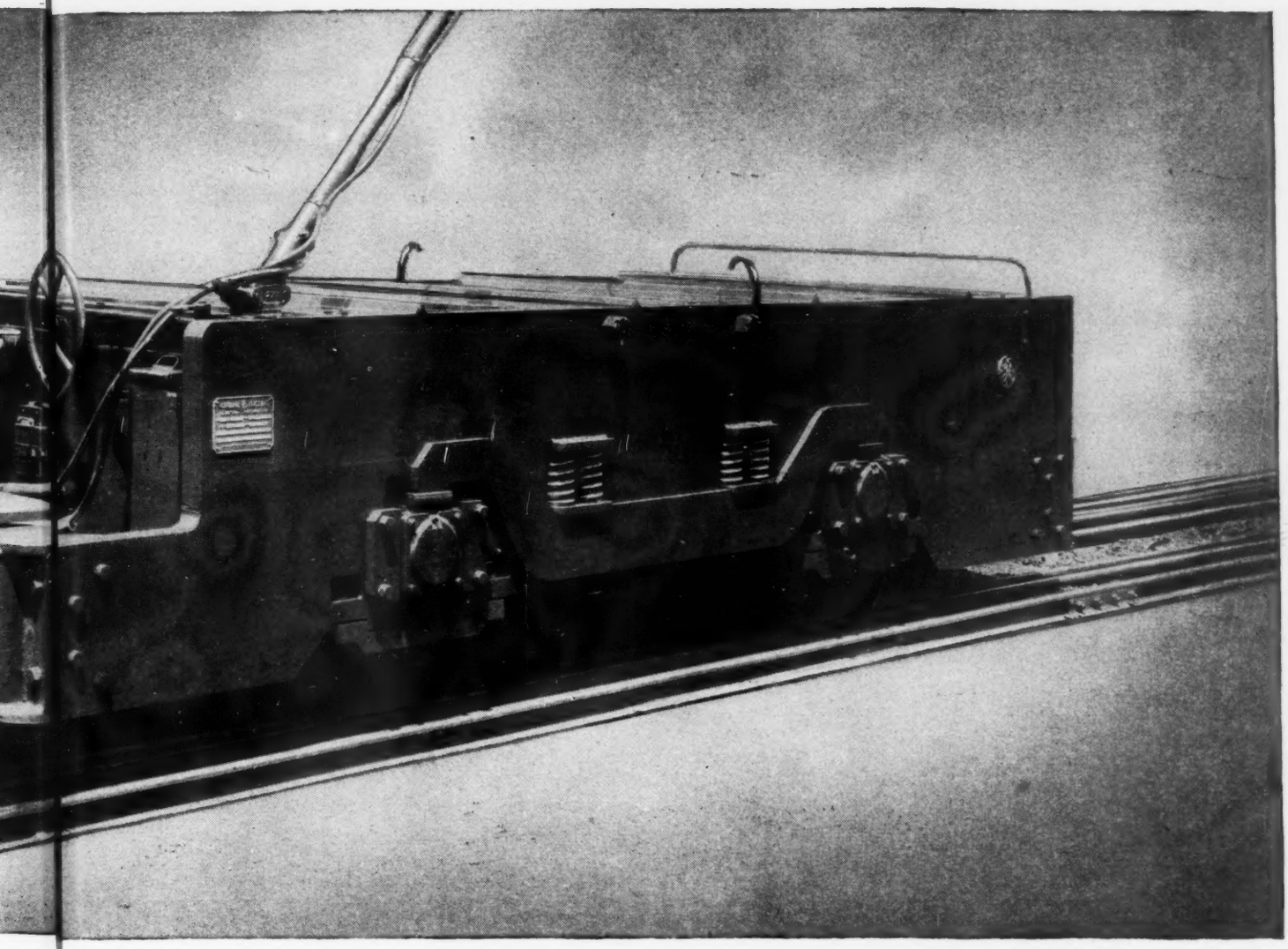
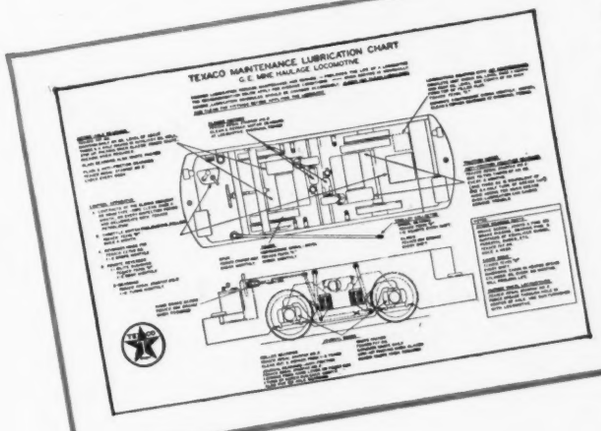
featuring Gordon MacRae,
Alan Young,
Evelyn Knight:
ABC Network.

TEXACO

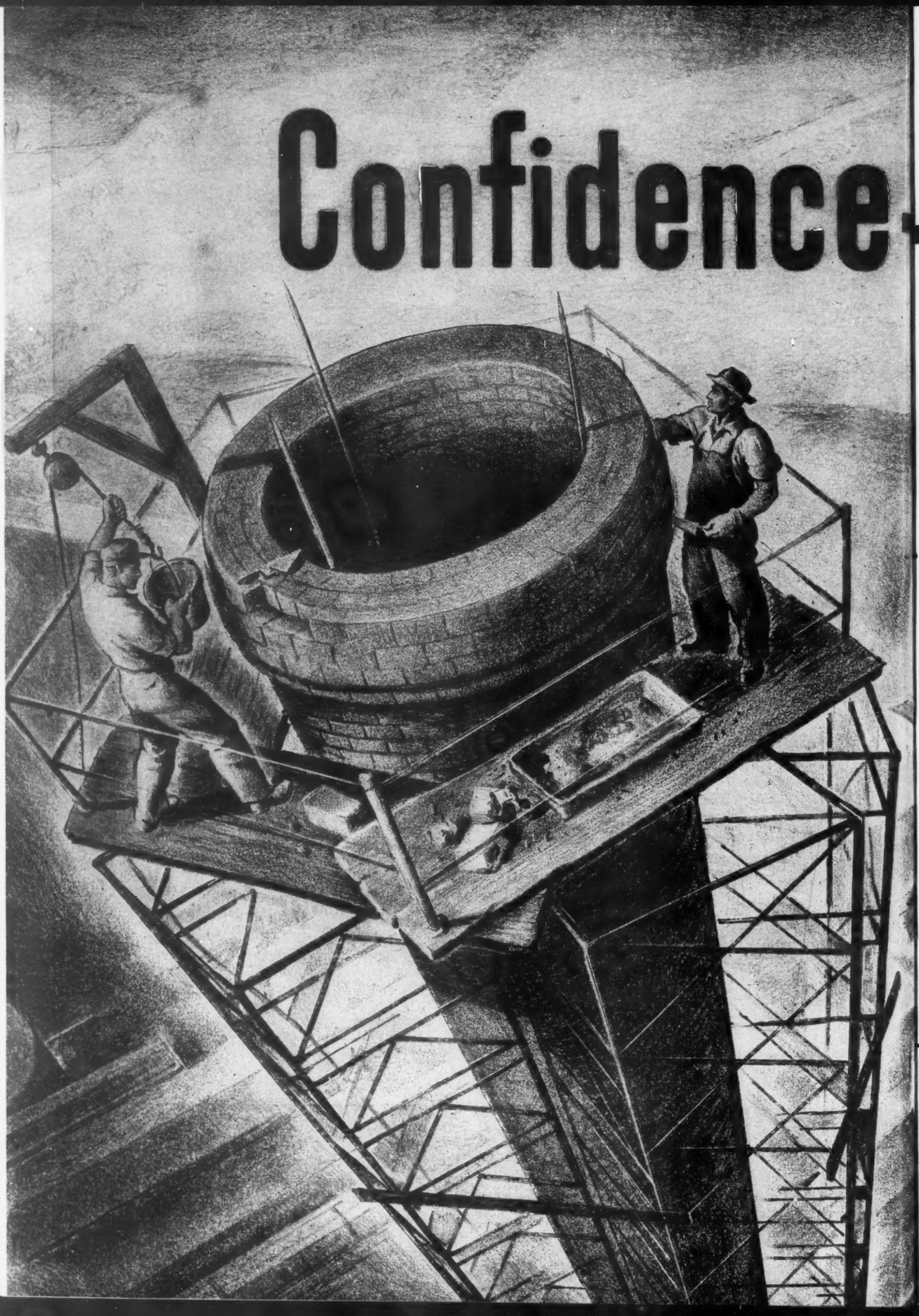
TEXACO LUBRICANTS

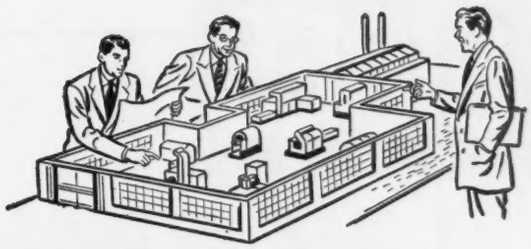




FREE — TEXACO MAINTENANCE LUBRICATION CHARTS: Leading manufacturers of underground coal mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricant. Write for the charts you need, stating make and model of each machine.

For the Coal Mining Industry


Confidence-



WITH ITS SLEEVES ROLLED UP!

STRAIGHT AND STALWART, every factory stack is a towering symbol of man's faith in the future . . . industry's confidence in its ability to create and to expand production for better living and a richer world.

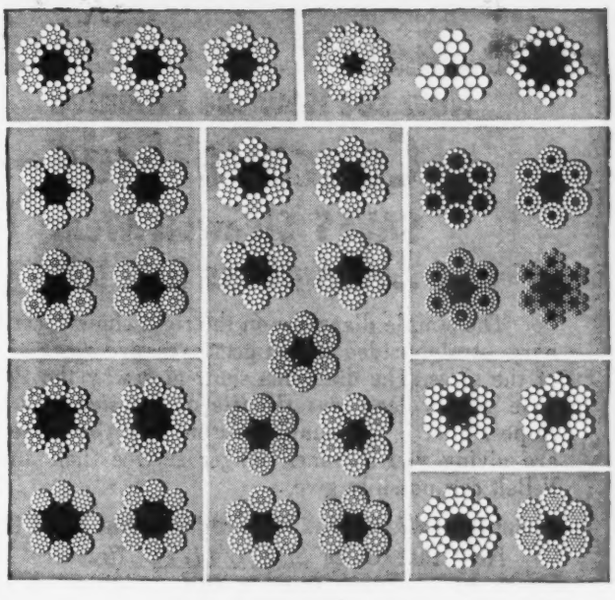
With confidence like that, Roebling has pioneered in developing and making an extraordinary range of products indispensable to industry. And the confidence that its products and engineering skill have earned in every industrial field is one of Roebling's most valued assets. Every Roebling employee is striving to safeguard that confidence by making products and rendering services that are of maximum utility to you.

YOU CAN'T GO WRONG WITH THE RIGHT WIRE ROPE

EVERY TYPE of Roebling Wire Rope is right for certain service. But that's not enough . . . the important thing is that you choose the one rope that's *right* for your own job . . . the rope with the right balance of strength, flexibility, fatigue and abrasion resistance to give real economy over a long period of use.

Your Roebling Field Man will gladly study your requirements, and you can have full confidence that the rope he recommends will give you top returns per dollar. Whatever type it is, preformed or non-preformed, it will have behind it Roebling's unequalled experience in research, development and manufacturing the finest wire products that can be made.

Call or wire the nearest Roebling branch office.



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ROEBLING

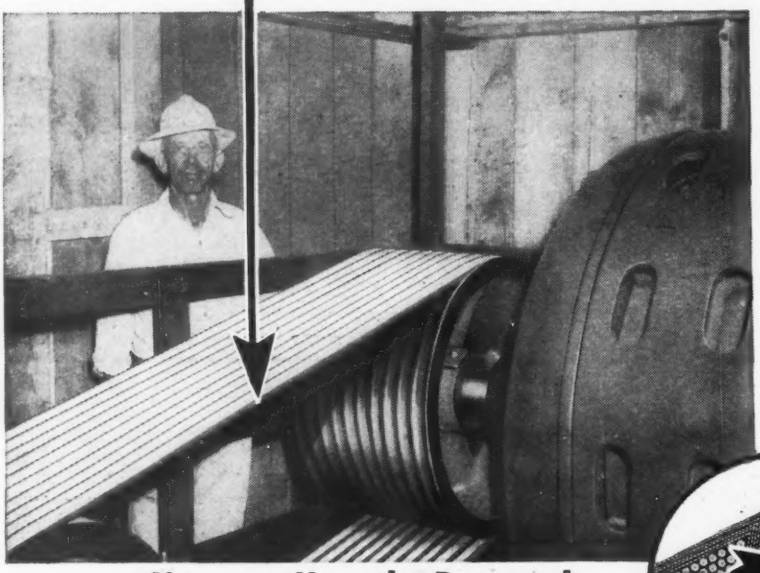
A CENTURY OF CONFIDENCE

JAR ROEBLING

The SIDES of a V-Belt . . .

Diagram of V-Belt in Sheave Groove

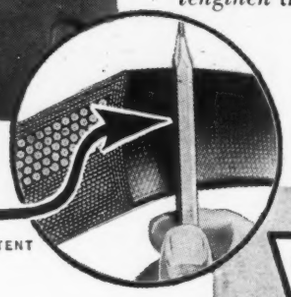
Really DRIVE the Pulley
They PICK UP and DELIVER the POWER!
Naturally They GET the WEAR



Anyone experienced with V-Belt drives knows that the *sides* of a V-Belt are what really get the wear.

It's the *sides* that grip the pulley. They pick up all the power from the driver pulley, transmit that power to the belt as a whole and then, once more, deliver the power to the driven pulley. Moreover, it's the sides that take all the wear against the sheave-groove wall.

That is why you have always noticed that the *sidewall* of a V-Belt is the part that *wears out first*—and, naturally, if you prolong the life of the sidewall, you *lengthen* the *life* of the *belt!*



Now see How the Patented Concave Side

A GATES PATENT

SAVES Sidewall Wear ...Lengthens Belt Life

The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. The diagrams show also why the Patented Concave Side greatly *lengthens the life* of the *sidewalls* of Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belt can possibly give.

Saving SIDEWALL WEAR is more important NOW than ever before.

Now that Gates *SPECIALIZED* Research has resulted in Super Vulco Ropes capable of carrying much heavier loads—fully 40% higher horsepower ratings—the sidewall of the belt is called upon to do even more work in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important now than ever before!

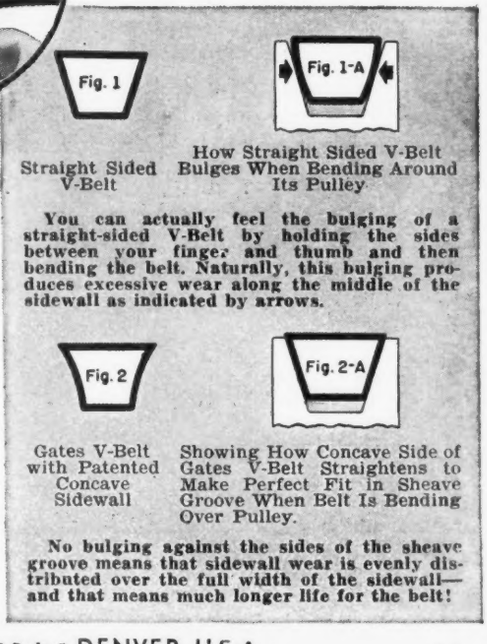


Fig. 1
Fig. 1-A
Straight Sided V-Belt
How Straight Sided V-Belt Bulges When Bending Around Its Pulley
You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.
Fig. 2
Fig. 2-A
Gates V-Belt with Patented Concave Sidewall
Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley.
No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

THE GATES RUBBER COMPANY *"The World's Largest Makers of V-Belts"* DENVER, U.S.A.

484

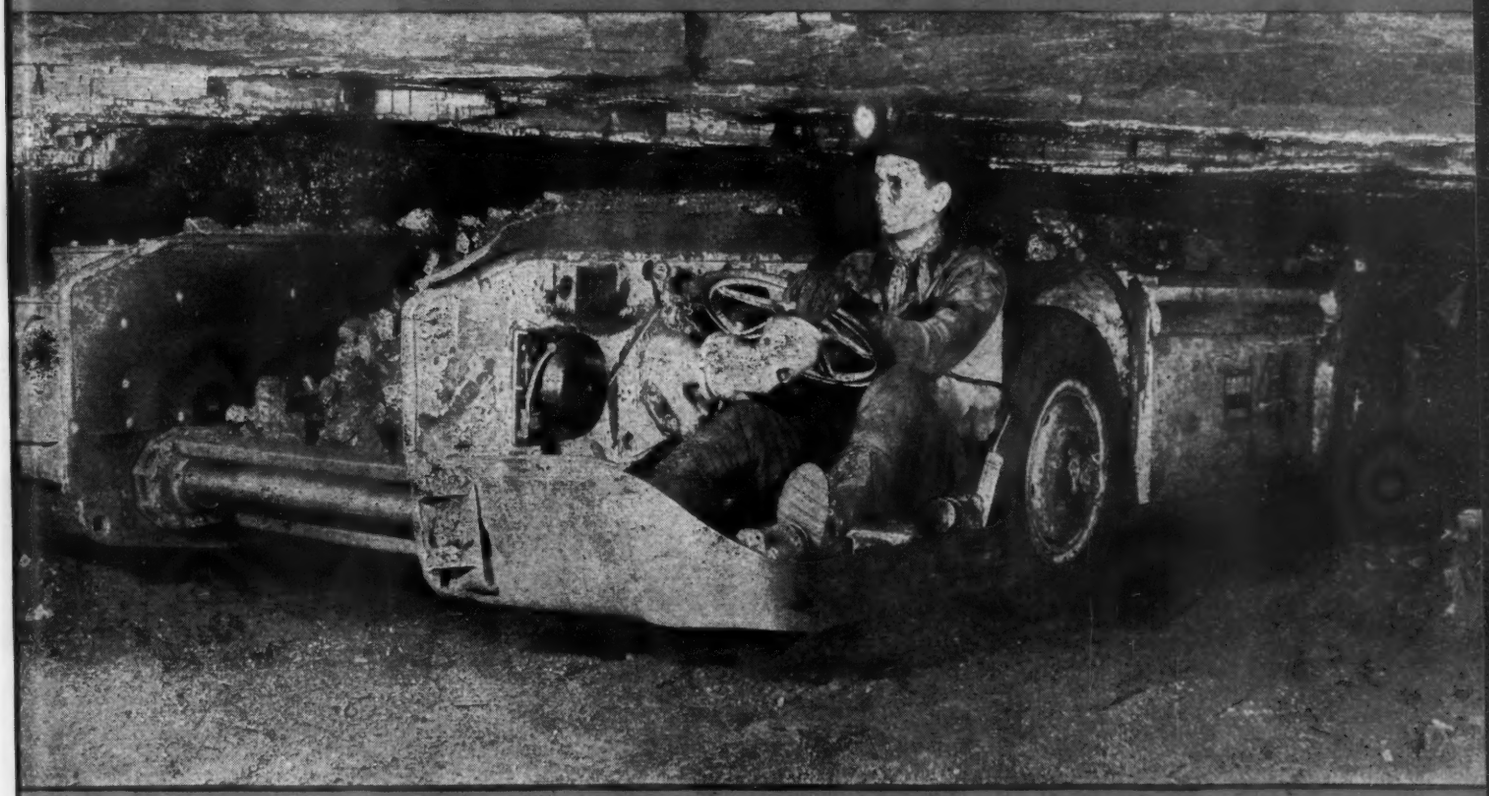
Gates

The Mark of SPECIALIZED Research

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

INCREASES TONNAGE... LOWERS PRODUCTION COSTS!



JOY SHUTTLE CARS

Joy 42" Shuttle Car for medium seams. Capacity approximately 5 tons.

Joy 60" Shuttle Car for seams six feet or more high. Capacity 5 to 10 tons.

Your production will swing upward and your costs will go down with Joy Shuttle Cars speeding the movement of coal from the face to conveyor or mine car. Models for high and low seams!

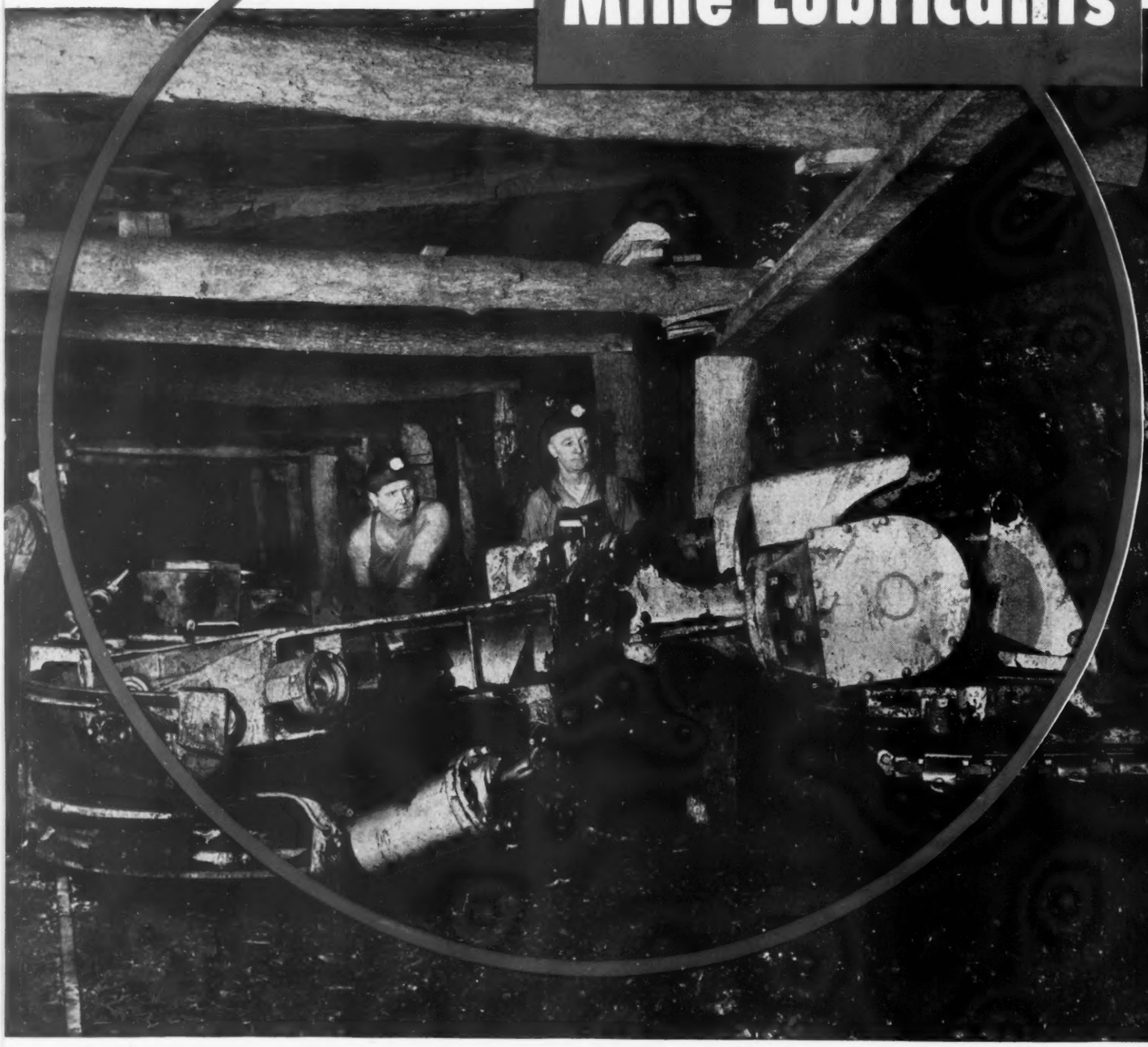
Consult a Joy Engineer

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

Now! Cutter and Loader Lubrica

Superla
Mine Lubricants



STANDARD OIL COMPANY (INDIANA) ST

rcation Improved 5 ways...

Tested in midwest mines under severest conditions of operation, Superla Mine Lubricants have brought these improvements to cutter and loader lubrication:

1. **CLEANER OPERATION.** Superla Mine Lubricants resist heat, minimizing deterioration of the lubricant and the formation of carbon. Cleaner operation with these improved lubricants eliminates a frequent cause of wear.
2. **NO WARM-UP TIME.** Superla Mine Lubricants are fluid at low temperatures. When the machine starts, controls operate freely. Wear is reduced because the lubricants flow readily to bearings, gears and clutches.
3. **NO OVERHEATING.** Superla Mine Lubricants do not thin out excessively at machine-operating temperatures. This quality assures proper lubrication of machine parts during long periods of continuous operation.
4. **EASY TO DISPENSE.** Superla Mine Lubricants pour readily from bung-type barrels (except the two heaviest grades which are used only for special loader conditions). They also handle easily in all types of dispensing equipment.
5. **LOW CONSUMPTION.** Superla Mine Lubricants have reduced consumption as much as 15% in severe mine tests.

A Standard Oil Lubrication Engineer will be glad to help you test Superla Mine Lubricants in your machines. Write Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Ill.

Six Grades for lubricating any type of cutter or loader...

No. 00. An oxidation-inhibited oil containing a detergent additive. It provides exceptionally clean operation and low oil consumption for oil-lubricated gear cases.

No. 0. A high quality additive type oil similar to No. 00 except that it is a slightly heavier grade. It is designed for Goodman loaders and cutters.

No. 2. A soft, semi-fluid grease for lubricating gathering-head gear cases, where greater fluidity is desired than that usually provided by most loader greases.

No. 4. A semi-smooth grease particularly resistant to thinning out under heat and mechanical working. At the same time it can easily be poured from the barrel bung at ordinary mine temperatures. It is especially designed for Joy loaders.

No. 6. A grease of heavy consistency and good high-temperature characteristics. Its fibrous structure makes it particularly useful on mine car wheels and for general underground lubrication.

No. 8. A smooth grease having superior high-temperature characteristics. It is suitable for armature bearings and pressure gun work where a grease of heavy consistency is desired.

IA) STANDARD OIL COMPANY (INDIANA) STANDARD

FORM-SET

Even when Form-Set rope has been cut, the wires and strands cannot fly apart. There are no locked-up inner forces to make the rope "wild."

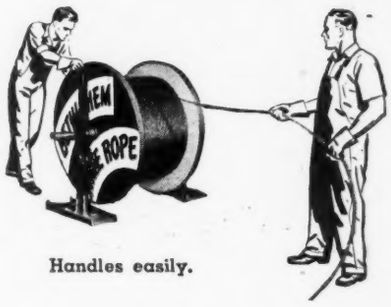
plays on your side

What we mean is, Form-Set rope begins to save you time the instant you unreel it. Even as the first few feet come off the reel, Form-Set starts to cooperate. You'll notice how it resists kinking; how smoothly and easily this flexible wire rope flows around drums and sheaves. Doesn't waste working time by fighting every move you make.

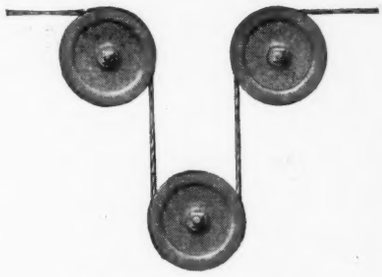
The reason is that Bethlehem Form-Set is preformed rope, and the preforming process relieves internal stresses. The steel wires and strands are "relaxed" at the plant by mechanical means, and the tension can never return. This rope, therefore, is always tractable, well-behaved, easy to handle.

There's another big advantage, too. Because of its freedom from internal stress, Form-Set rope better resists bending fatigue. Thus, on applications requiring sharp or reverse bends, Form-Set often has longer life.

There are probably certain sizes and types of Bethlehem rope that are favorites of yours. Any or all of them can be obtained with the Form-Set feature. A Bethlehem man will be glad to point out where Form-Set rope will be of greatest advantage to you.



Handles easily.



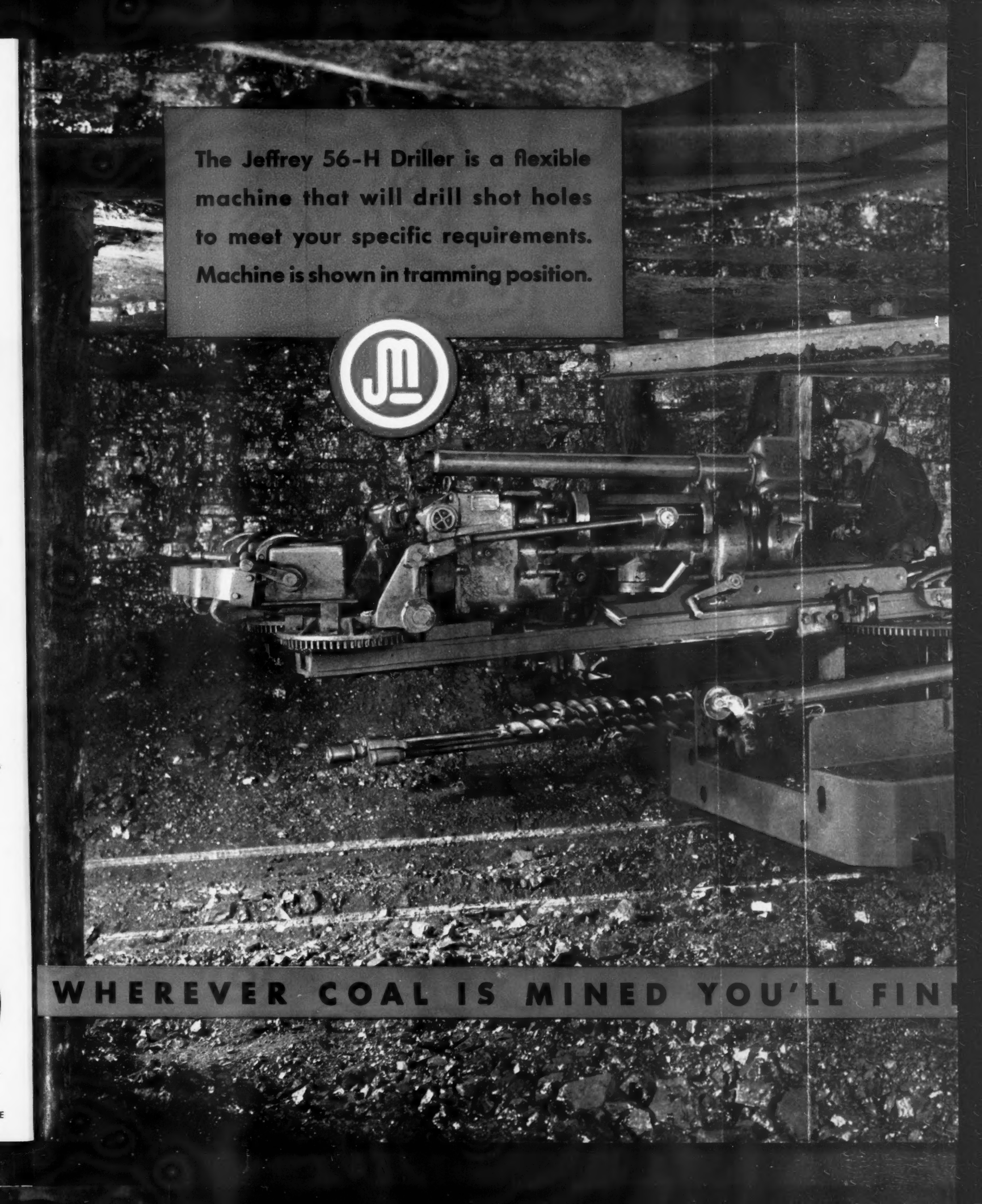
Ideal for reverse bends.

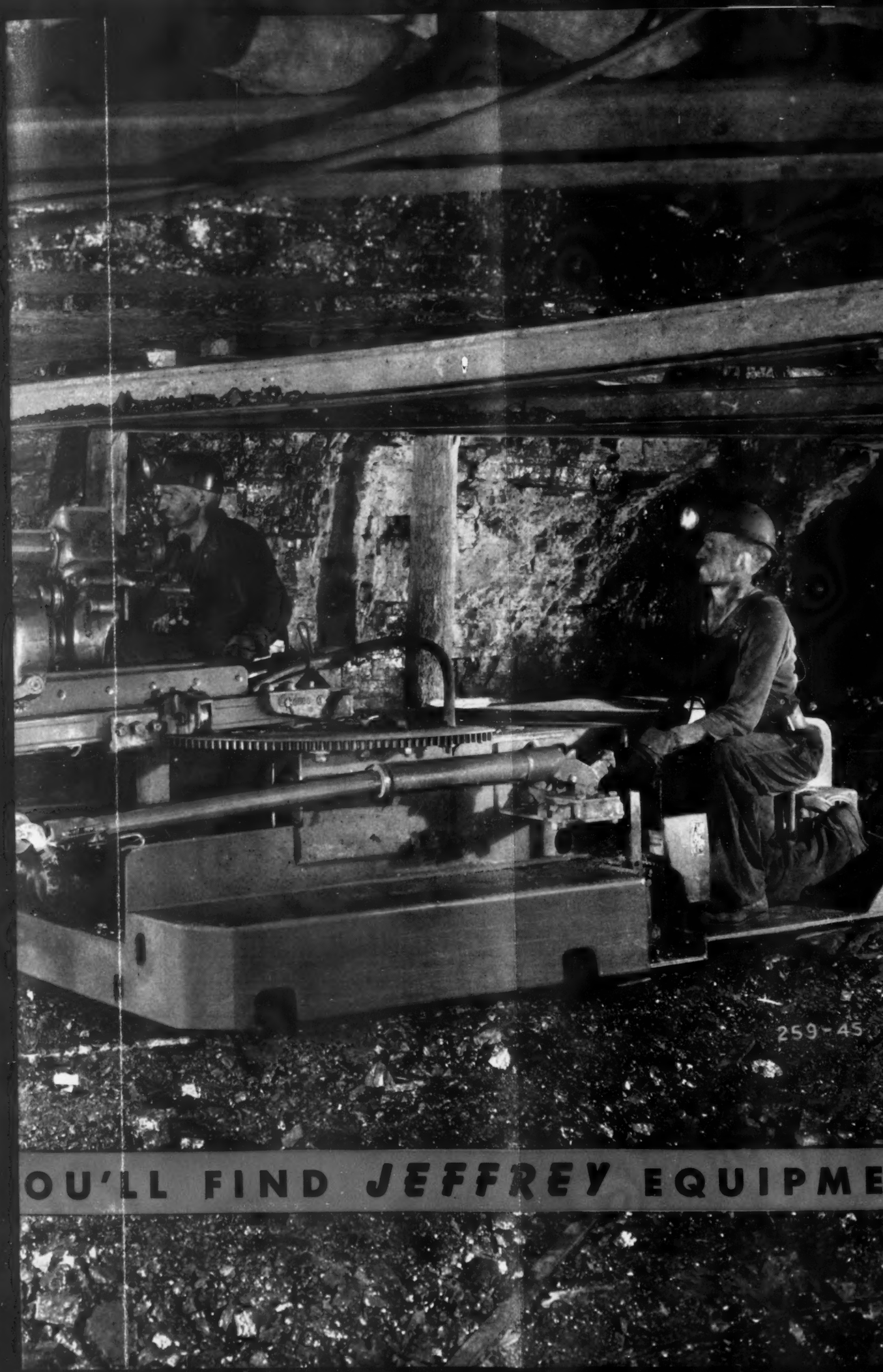
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

When you think WIRE ROPE . . . think BETHLEHEM


The Jeffrey 56-H Driller is a flexible machine that will drill shot holes to meet your specific requirements. Machine is shown in tramming position.
WHEREVER COAL IS MINED YOU'LL FIN


259-45
OU'LL FIND JEFFREY EQUIPME

9-45
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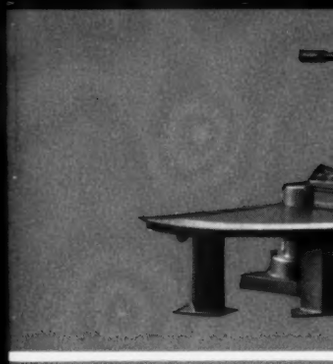

Built to do a
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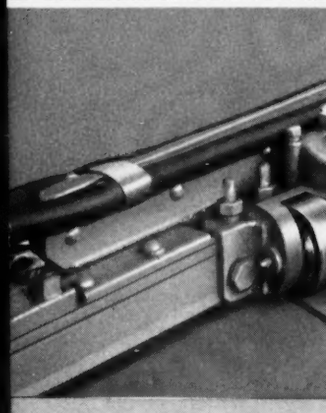
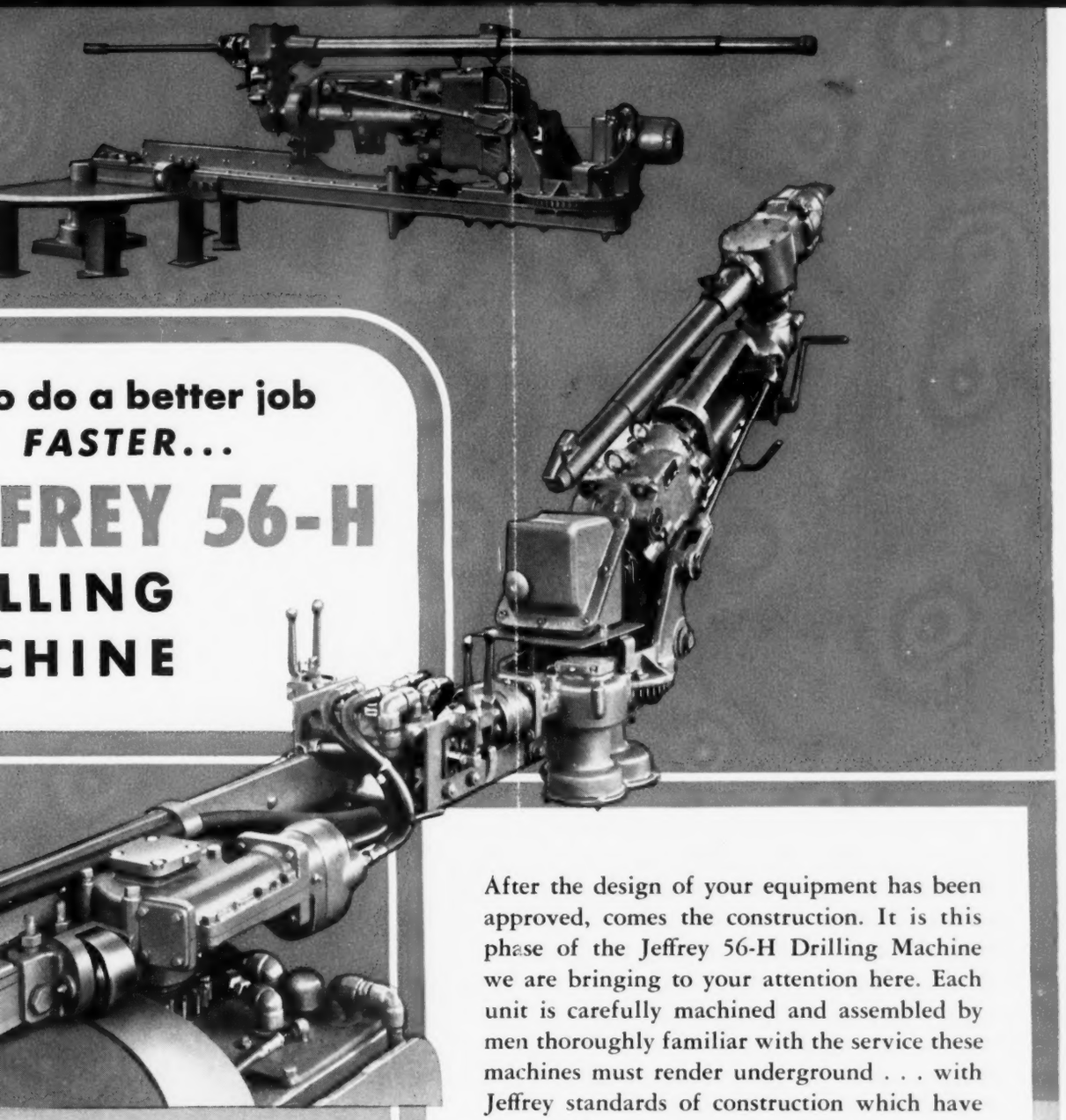
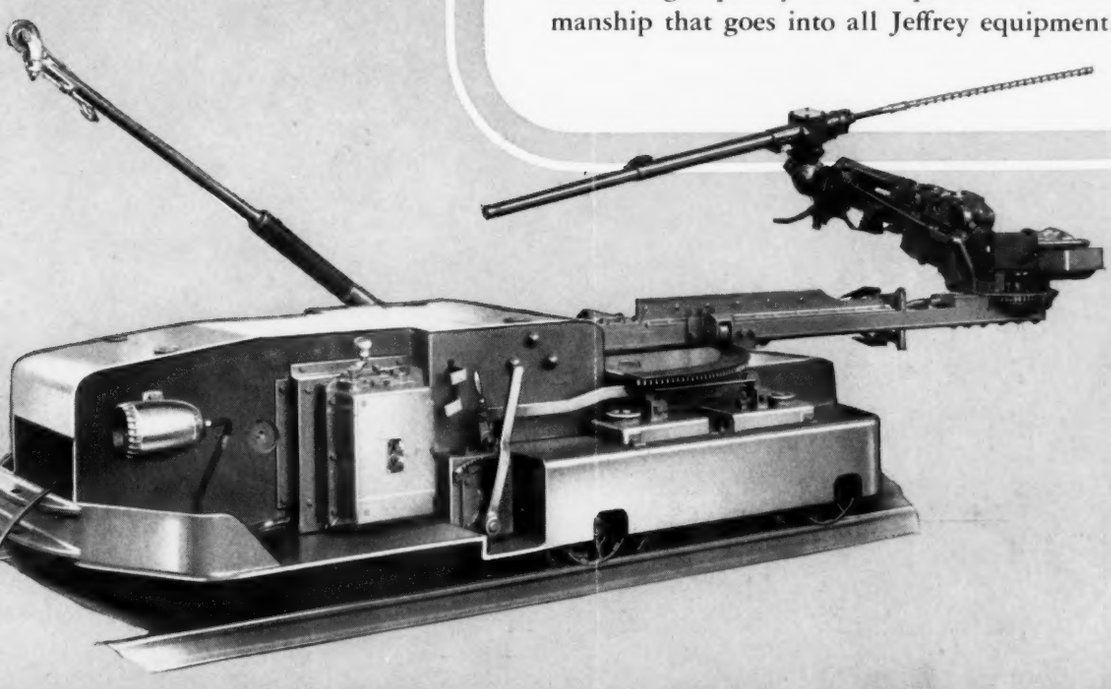




o do a better job
FASTER...
FREY 56-H
LLING
CHINE

After the design of your equipment has been approved, comes the construction. It is this phase of the Jeffrey 56-H Drilling Machine we are bringing to your attention here. Each unit is carefully machined and assembled by men thoroughly familiar with the service these machines must render underground . . . with Jeffrey standards of construction which have been built up over years of experience in designing and building mine equipment. The construction of the 56-H Drilling Machine is typical of the high quality of both parts and workmanship that goes into all Jeffrey equipment.



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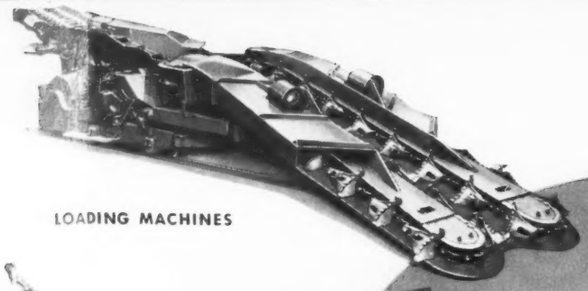
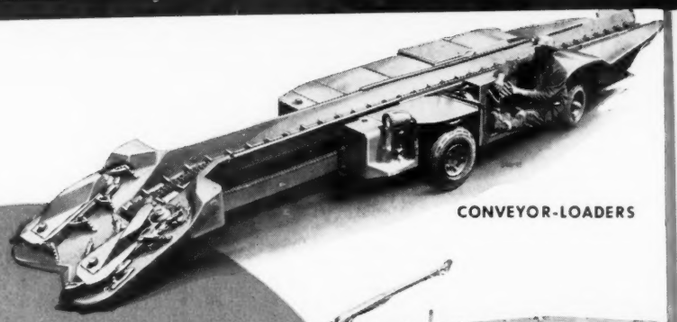
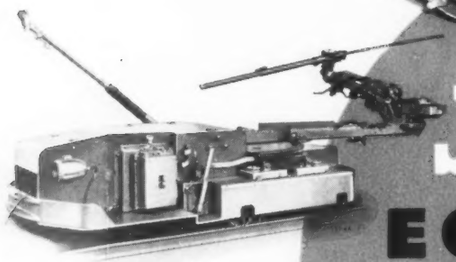


LOADING MACHINES

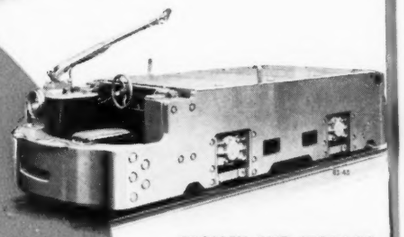


CONVEYOR-LOADERS

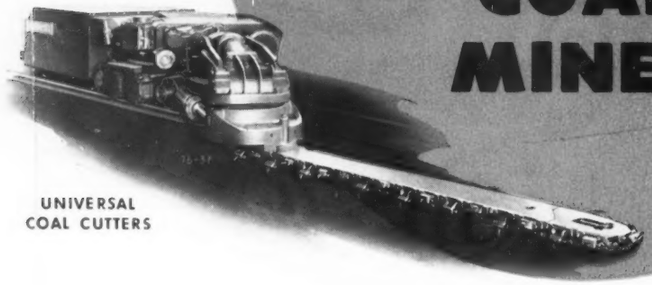


DRILLS AND
DRILLING MACHINES

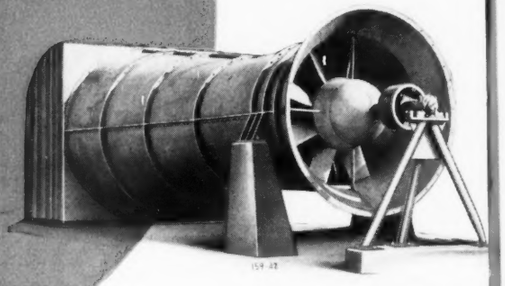
JEFFREY EQUIPMENT FOR COAL MINES



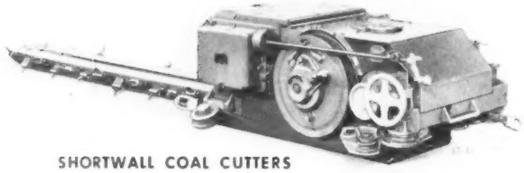
TROLLEY AND STORAGE
BATTERY LOCOMOTIVES



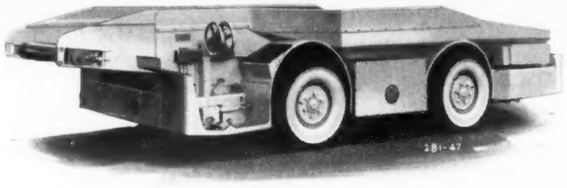
UNIVERSAL
COAL CUTTERS



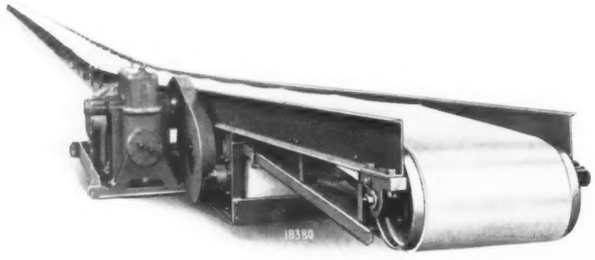
FANS AND BLOWERS

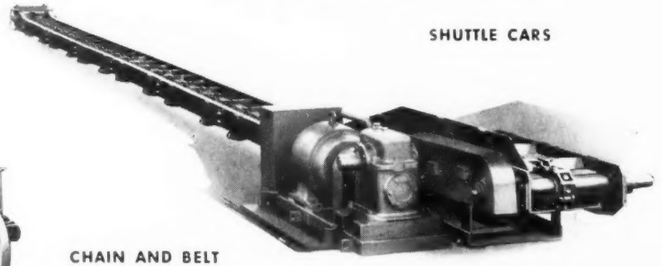


SHORTWALL COAL CUTTERS



SHUTTLE CARS





CHAIN AND BELT
TYPE CONVEYORS

AND GENUINE RENEWAL PARTS

THE JEFFREY MANUFACTURING COMPANY

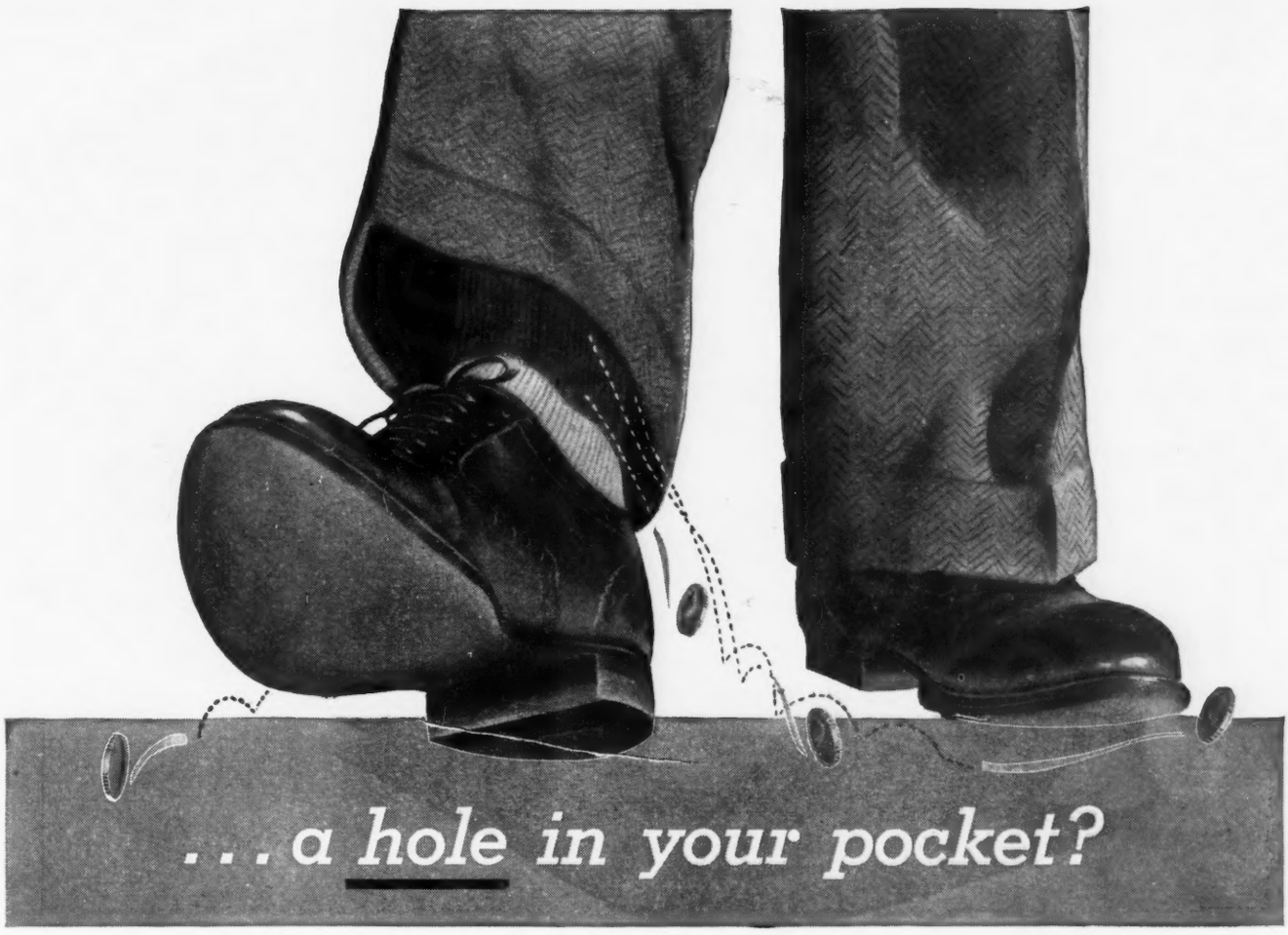
Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Jacksonville, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City

Service Stations: Pittsburgh, Harlan, Ky., Birmingham, Mt. Vernon, Ill., Logan-Beckley, W. Va., Scranton

Foreign Plants: Jeffrey Mfg. Co., Ltd., Montreal, Quebec; British Jeffrey-Diamond Ltd., Wakefield, England; Jeffrey-Galion (Pty), Ltd., Johannesburg, S. A.

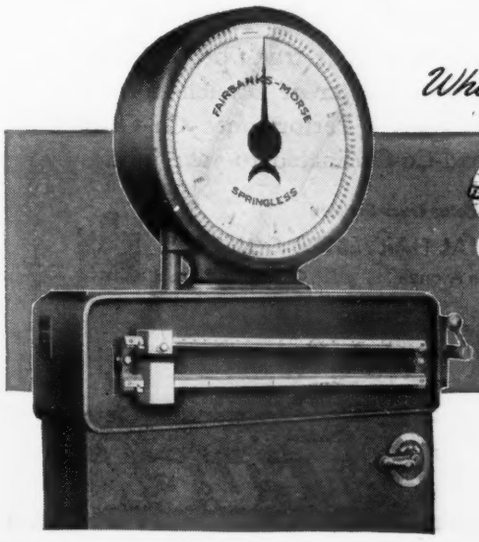


. . . a hole in your pocket?

It is easier to prevent big losses than to prevent cumulative small ones. You are always on guard against the big losses . . . small ones often go unnoticed.

Your scale may be accurate but this is not sufficient insurance that your weights are correct. From many accurate scales in service today it is difficult to obtain a quick, accurate reading. There is still chance for human errors . . . with loss of money and time. When you select a dial scale, you should choose the one which is the quickest and easiest to read. Fairbanks-Morse's unique principle of the direct reading dial in all capacities is a feature found in no other dial scale.

Why not have your local Fairbanks-Morse weighing expert demonstrate the direct reading dial principle and how it can help your operations. He will be glad to do so without any obligation. Fairbanks, Morse & Co., Chicago 5, Illinois.



When it comes to scales...

FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • STOKERS • SCALES • MOTORS • GENERATORS
PUMPS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS

NOTE WHAT
INTERNATIONAL TRUCKS OFFER

1. A Truck of the Right Size and Type for Every Job.
2. Performance-Co-Ordination.
3. Load-Co-Ordination.

Yes, International Trucks are profit-makers for coal companies for the three compelling reasons listed above.

They're Performance-Co-Ordinated. That means they're expertly fitted to their jobs. And that in turn means rock-bottom operating economy and long, trouble-free service.

They're Load-Co-Ordinated. And that means an expert recommendation from your International Dealer or Branch about the exact amount of payload *most* profitable for *your* trucks on *your* jobs.

International Load-Co-Ordination is based on the International Truck Point Rating System—exclusive with International—and a scientific system—(Note that!)—not guess work.

So no matter what your truck problem, see your International Dealer or Branch—for the right trucks, expertly Performance-Co-Ordinated and Load-Co-Ordinated to *your* jobs.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

Tune in James Melton on "Harvest of Stars!" CBS, Wednesday Night

THIS EMBLEM IDENTIFIES GREAT TRUCKS
INTERNATIONAL

INTERNATIONAL Trucks

As shown, Simplex-ANHYDREX Underground Cables have the conductors coated with an alloy and then an adequate wall of the famous Simplex-ANHYDREX low water absorption insulation which is remarkably stable, both electrically and physically, in the presence of moisture. Colored braids or tapes are applied over each individual conductor. The conductors are twisted and then jute filled to make the cable round. Over this is a thick wall of specially compounded neoprene.

Simplex-ANHYDREX Underground Cables are easily pulled into ducts or they can be buried directly in the ground without any further protection. Where they come up above ground, the neoprene jacket effectively prevents deterioration due to sunlight and weather. The jacket also resists the action of ground acids and alkalies, as well as oil, heat and flame.

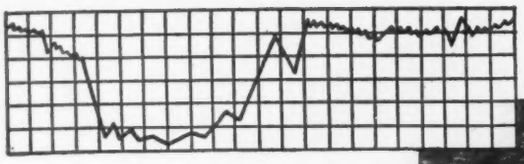
Simplex-ANHYDREX Cables can be used underground, with or without ducts. They can be used in the air, supported from messenger wire. They have many applications as power, traffic signal, railway signal, control, supervisory control, telephone and telegraph installations.

A copy of the Simplex-ANHYDREX Cable book will be sent to you upon request.

Simplex

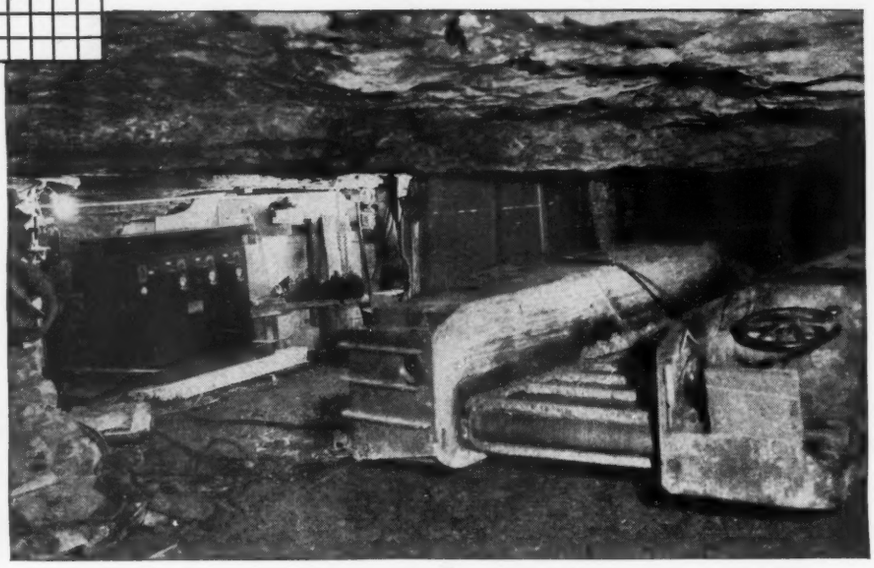
WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



OFF-PEAK POWER

keeps them *CHARGED*



SIX OR SEVEN hours of charging per day during the off-peak period . . . that's normally time enough for full recharge of the batteries that operate your mine haulage equipment—*provided they are* EDISON *Nickel-Iron-Alkaline Batteries.* The reason: EDISON Batteries can be charged day after day at an average of their normal rate without injury.

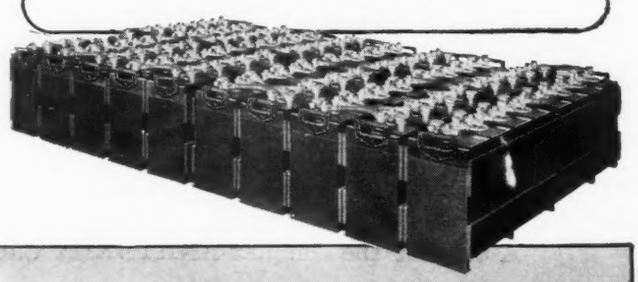
In addition, they require no critical adjustment of the charge rates. That means that you can charge them directly from the d-c power lines through suitable resistors.

EDISON Nickel-Iron-Alkaline Batteries have many other built-in advantages: their rugged steel construction inside and out withstands rough usage; their electrolyte, an alkaline solution, is a natural preservative of steel; their electrochemical principle of operation is free from self-destructive reactions. That's why they stay on the job, out of the repair shop. That's why they cut annual operating cost and give longer service life than any other type of battery.

Specify EDISON and you specify maximum reliability—enduring quality.

In Mine Locomotives and Shuttle Cars EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages

- ★ They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- ★ They are **foolproof electrically;** are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- ★ They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- ★ They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- ★ They can **stand idle indefinitely** without injury, without attention, and without expense.
- ★ They are **simple and easy to maintain.**



EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON
STORAGE BATTERY DIVISION
of Thomas A. Edison, Incorporated
West Orange, N. J.

IN CANADA: International Equipment Co., Ltd., Montreal and Toronto

BWH
DEPENDABLE RUGGEDNESS
This is the exclusive BWH ROTO-CURE Process of continuous vulcanization. It does away with the 30-foot overlaps occurring in the old-fashioned flat press curing, eliminates the possibility of operational weakness caused by such overcuring.
Cured Belt
Continuous Uniform Cure
Continuous Uniform Stretch

RECORD BWH BELT HAUL

Proof of the Advantages of the Exclusive BWH ROTOCURE Process of Continuous Vulcanization

Copper ore is jagged. Heavy loads, steadily biting and clawing at a conveyor belt, inflict the worst kind of punishment. So the operator of this big western mine, knowing the advantages of the exclusive BWH ROTOCURE Process of continuous vulcanization, specified a Bull Dog Belt for this job. His judgment was fully justified, for in 2,256 days of operation, 15,594 tons of ore were hauled every day!

Here's why belts made by the ROTOCURE Process are constantly making just such outstanding performance records:

1. ROTOCURE eliminates the press overlaps which occur every 30 feet in belts made in a flat press. And actual tests prove such overlaps may reduce flex-life as much as 40%.
2. ROTOCURE eliminates mechanical distortion, which occurs at press ends in flat-press curing.
3. ROTOCURE eliminates uneven stretch, because this process maintains constant, uniform stretch control during curing.
4. ROTOCURE eliminates overcure caused by press overlaps in rubber covers of conveyor belts. This makes them uniformly abrasion-resistant.

HAVE YOU A JOB WHERE STAMINA COUNTS?

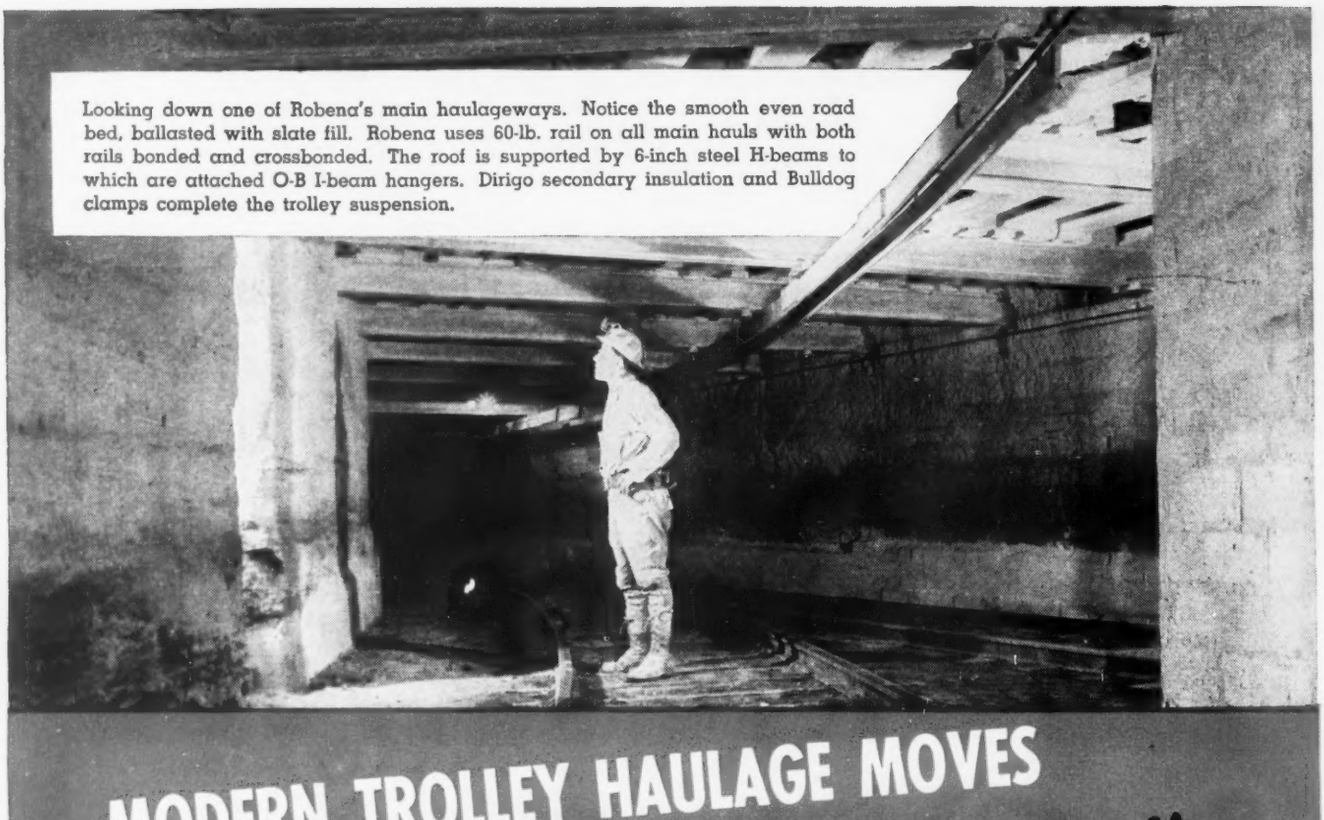
Bring us your toughest problems — we're specialists in solving them. Consult your nearest BWH distributor or write us direct.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all principal cities

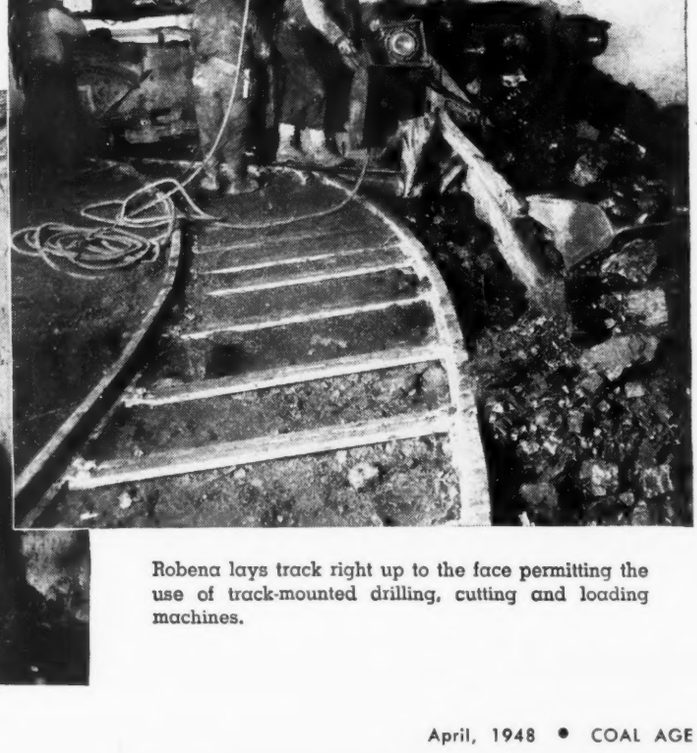
PLANT: CAMBRIDGE, MASS. U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.



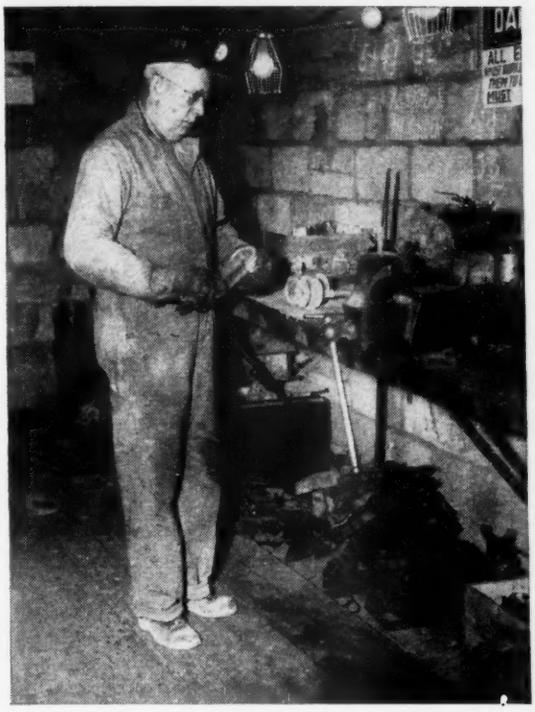
Looking down one of Robena's main haulageways. Notice the smooth even road bed, ballasted with slate fill. Robena uses 60-lb. rail on all main hauls with both rails bonded and crossbonded. The roof is supported by 6-inch steel H-beams to which are attached O-B I-beam hangers. Dirigo secondary insulation and Bulldog clamps complete the trolley suspension.

MODERN TROLLEY HAULAGE MOVES *50,000 Ton-Miles of Coal Daily* . . . AT MAMMOTH ROBENA MINE

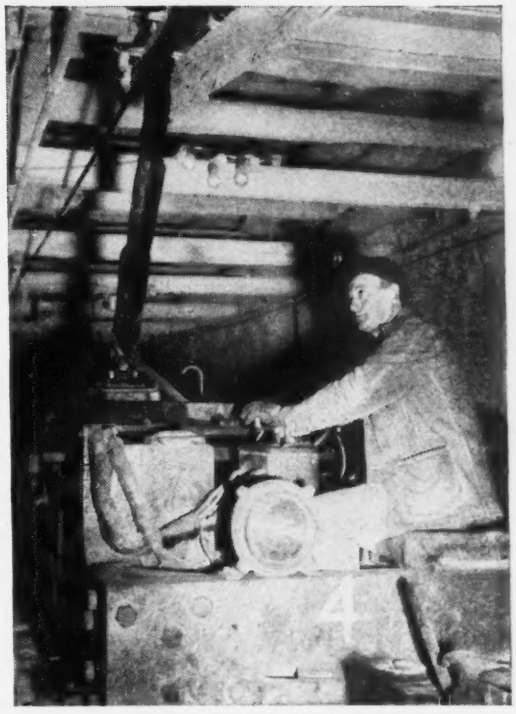
Eight-ton cable-reel trolley gathering motors bring the coal from the face loaders to section landings. Robena secondary haulage roads use 40-lb. track with the trolley supported from steel pipe driven into the rib. O-B horizontal adapters, Universal-2 hangers and Bulldog clamps hold the wire in place. Trolley is sectionalized into convenient lengths with O-B Metal Underrun Section Insulators.



Robena lays track right up to the face permitting the use of track-mounted drilling, cutting and loading machines.



Trolley wire at Robena is kept taut and free from encircling bumps. The trolley frog shown here is the O-B Type M, a smooth-underrun device.



Regular maintenance keeps Robena overhead in good condition. All reclaimed materials are thoroughly reconditioned before being put back into service.

• Modern trolley haulage is handling peak tonnages at Robena, famed mine of the H. C. Frick Coke Company, United States Steel Corporation subsidiary. Present haulage loads are in excess of 50,000 ton-miles daily. As Robena's output comes up to its expected capacity and haulage distances lengthen, this load will become still greater.

Because of its concentrated plan of mining and the enormous tonnages involved, Frick unhesitantly turned to modern trolley haulage as providing the best answer to its transportation problems. The system it operates resembles a real underground "railroad". Nearly 275,000 feet of trolley wire are now installed with more being added every day. Powerful 30-ton tandem locomotives ply the main haulage roads, making a total of more than 60 round trips per day.

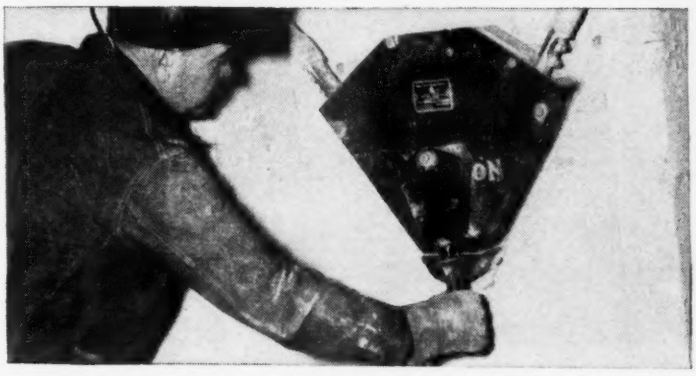
To make certain it gets the most from its haulage investment, Frick uses only the best materials obtainable. Long life is assured by careful and proper installation. Regular maintenance tells the rest of the story—a story that spells low-cost transportation efficiency.

Trolley haulage can bring the same results to your mine. Just follow the practice of using *good* materials, *good* installation and *good* maintenance. Taken together, they add up to *good* mine transportation.

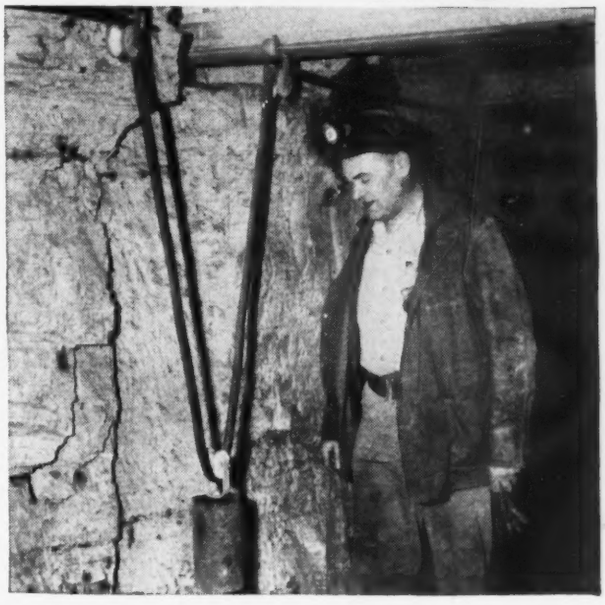
Ohio Brass

MANSFIELD, OHIO
CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

2820-M



O-B Safety Feeder Switches provide a safe means of breaking feeder circuits at all sectionalizing points.



To provide take-up in its telephone cables, Robena introduces a counterbalancing weight every 500 feet as shown in the construction above. This practice avoids breakage of the cable in case of roof falls.

SOMETHING *New* HAS BEEN ADDED

GOODMAN MANUFACTURING COMPANY

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

In England — UNITED STEEL COMPANIES, LTD.

SOMETHING OLD TAKEN AWAY

When the Goodman Bugduster is *added* as a working unit of the Type 512 Shortwall Coal Cutter, the labor and handicaps of slack removal are *taken away*.

No more raking of the kerf; no more shoveling of cuttings . . . in fact, no more shovel.

Yes Sir,

SHOVELING DAYS ARE OVER

#8148

Which type of rail bond do you need--

Wedge-type for quick installation in temporary track?

Welded type for permanent installation?

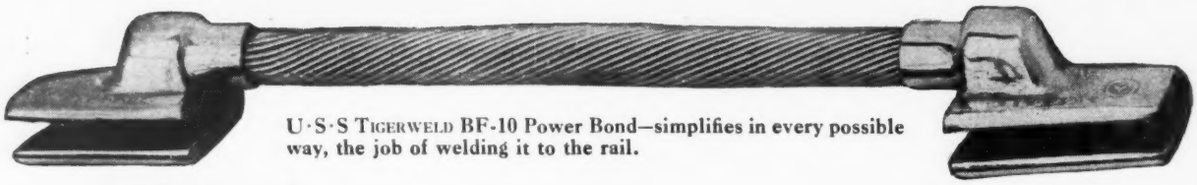
THERE's a place for both of these bonds in most mines.

The *Wedge-type Bond* can be installed in a few minutes with a high speed drill and a three-pound hammer. Three blows on each terminal and the bond is in. This bond is ordinarily used for temporary tracks but it holds so tight that many mines use it for permanent installation.

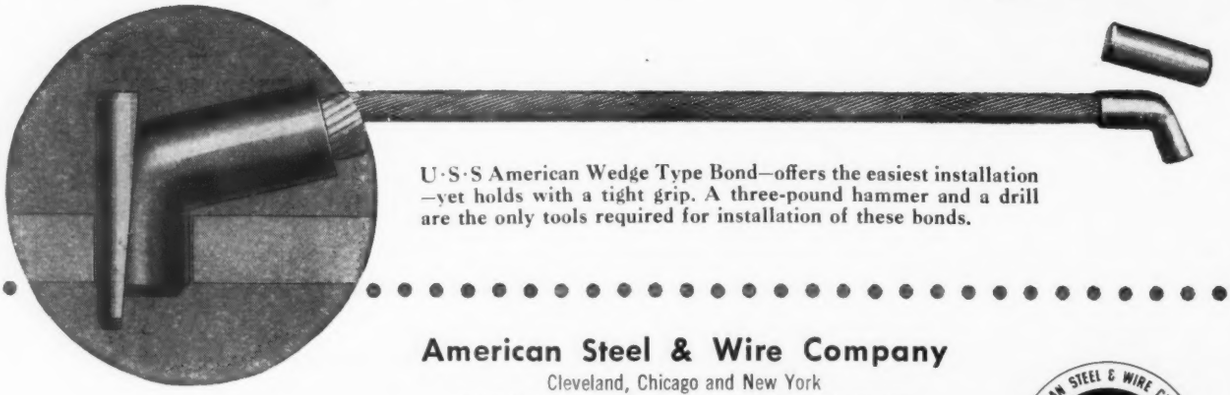
Welded Type. The TIGERWELD BF-10 is the newest welded-type bond and is simple to install. Just drive it on to the edge of the rail and weld it. No clamps are needed to hold the bond in position.

Installation crews can install more bonds per day and the track resistance is kept low. Both bonds have high resistance to vibration and are ruggedly built to withstand derailments.

For complete information on all types of U·S·S TIGERWELD Rail Bonds, contact our nearest sales office.



U·S·S TIGERWELD BF-10 Power Bond—simplifies in every possible way, the job of welding it to the rail.



U·S·S American Wedge Type Bond—offers the easiest installation—yet holds with a tight grip. A three-pound hammer and a drill are the only tools required for installation of these bonds.

American Steel & Wire Company

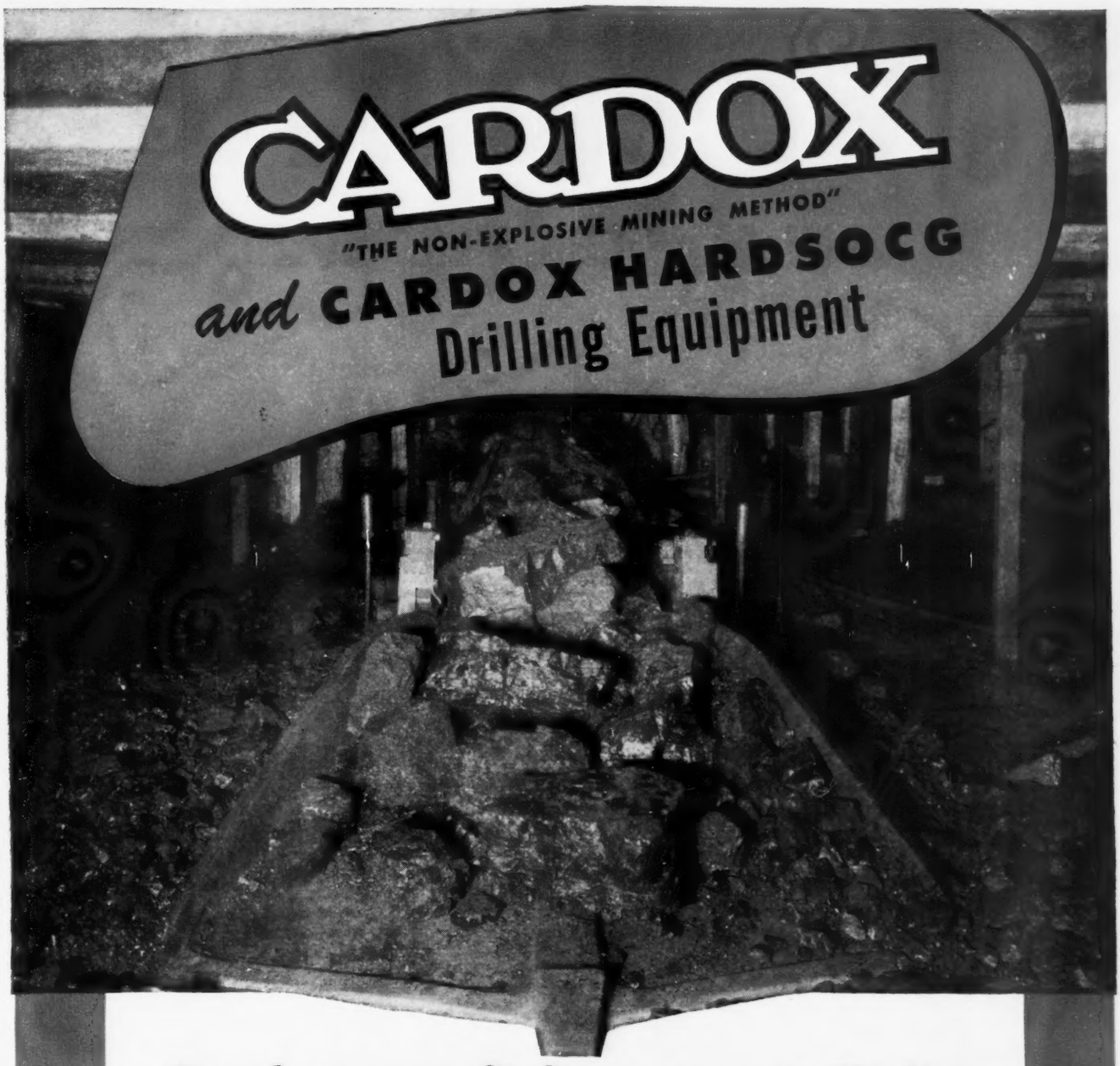
Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, Pacific Coast Distributors
Tennessee Coal, Iron & Railroad Co., Birmingham, Southern Distributors
United States Steel Export Co., New York

UNITED STATES STEEL

AMERICAN STEEL & WIRE COMPANY · USS · AMERICAN RAIL BONDS · UNITED STATES STEEL

U·S·S American Rail Bonds



Guard your profit from seam to Market

The advantage of the CARDOX mining method manifest themselves at practically every stage of production and marketing.

For example, longer cutter bars can be used . . . providing more coal per face. Loading is faster because the slow heaving action of CARDOX rolls the coal forward in a loose pile. This same action produces a maximum of coarse sizes, free of shatter-cracks, that will not crumble when subjected to extensive mechanical handling.

Finally, coal produced by the CARDOX mining method retains its premium size through long shipments by boat or rail, and in dealer's yards. This is proved by the fact that CARDOX mined coal is commonly shipped to markets far beyond the safe shipping range of "explosion-shattered" coal from the same region.

Write for full details on free demonstration of CARDOX production economies and marketing advantages.

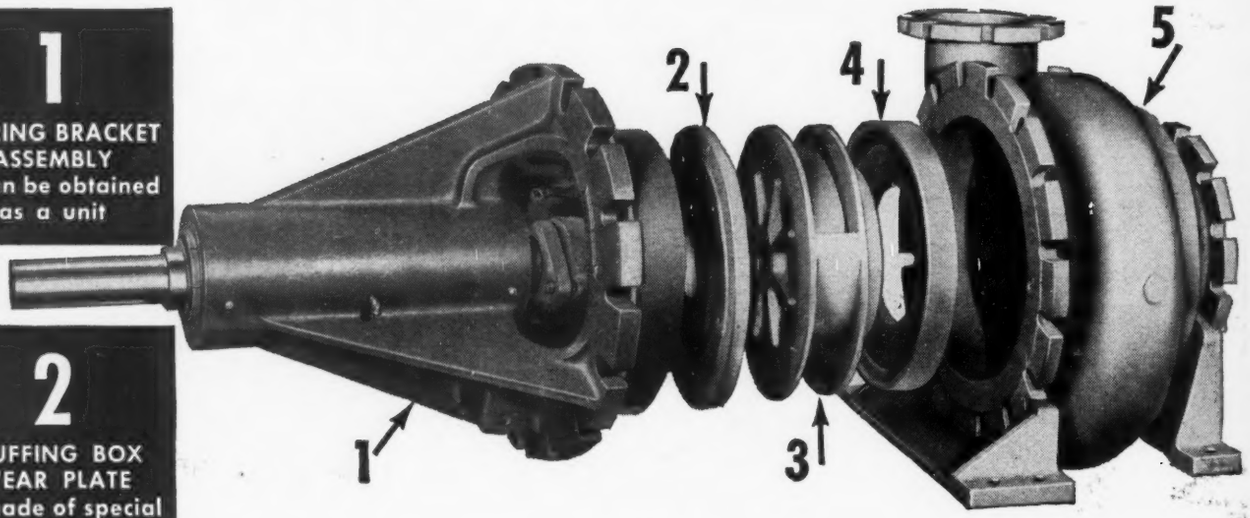
CARDOX CORPORATION • BELL BUILDING • CHICAGO, ILLINOIS

Only 5 Main Parts

TAKE WEAR IN ALLIS-CHALMERS SOLIDS PUMPS!

1 BEARING BRACKET ASSEMBLY — can be obtained as a unit

2 STUFFING BOX WEAR PLATE — made of special cast alloy



3 IMPELLER — designed to pump slurries of various consistencies

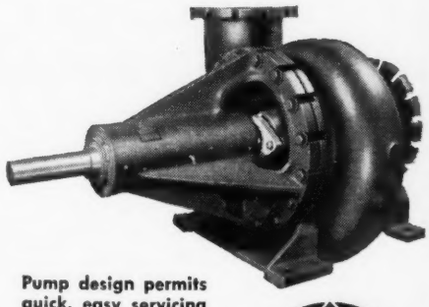
4 SUCTION WEAR PLATE — provides easily maintained clearance

5 CASING — well proportioned with heavy metal thickness

And that means Savings in Time—Low Replacement Parts Cost—Fewer Parts to Stock!

USERS OF ALLIS-CHALMERS Solids Pumps report parts inventory savings up to 70%! Down time slashed as much as 80%! Remarkable results like these are due to the simple design and the special abrasion-resistant alloy construction of these pumps. ☛ All parts are quickly and easily accessible. ☛ Entire rotating assembly can be removed without disturbing the piping arrangement. ☛ Comparable size pumps of different ratings have interchangeable parts.

Allis-Chalmers Solids Pumps are available in 7 sizes ranging from 175 gpm to 7000 gpm. Ask your nearby A-C office or dealer for additional information or write for bulletin 08B6381B. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2343



Pump design permits quick, easy servicing of stuffing box and adjusting of wearing clearances.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

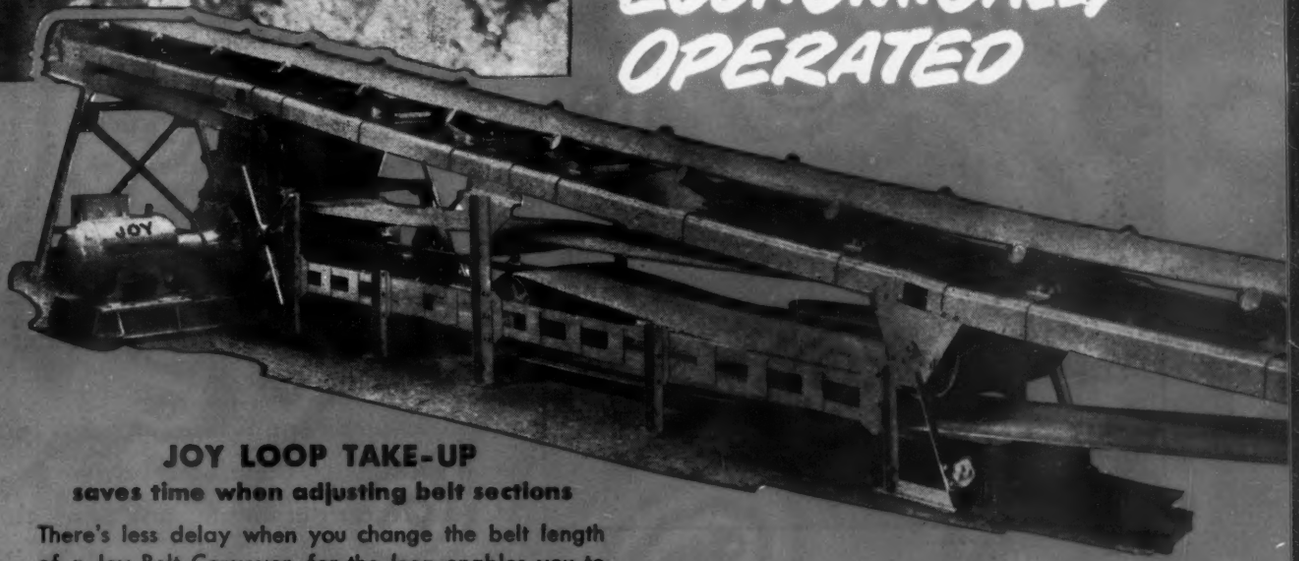
JOY

BELT CONVEYORS

engineered for long life and low maintenance

Shift after shift, Joy Belt Conveyors move a steady stream of coal over any length or type of installation —room, gathering or haulage—with a maximum of efficiency and service. Lost time is reduced to a minimum by fine engineering based on years of practical "know-how!"

RUGGEDLY BUILT... ECONOMICALLY OPERATED



Consult a Joy Engineer

JOY LOOP TAKE-UP

saves time when adjusting belt sections

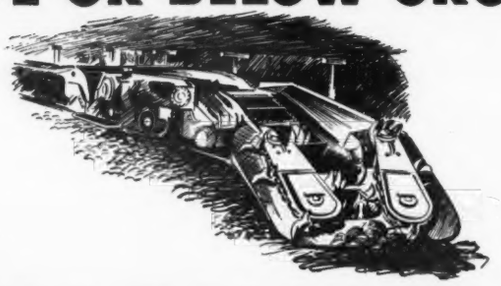
There's less delay when you change the belt length of a Joy Belt Conveyor, for the *loop* enables you to do the job quickly and simply—just another reason for Joy superiority.

W&D CL-1944

JOY MANUFACTURING CO.

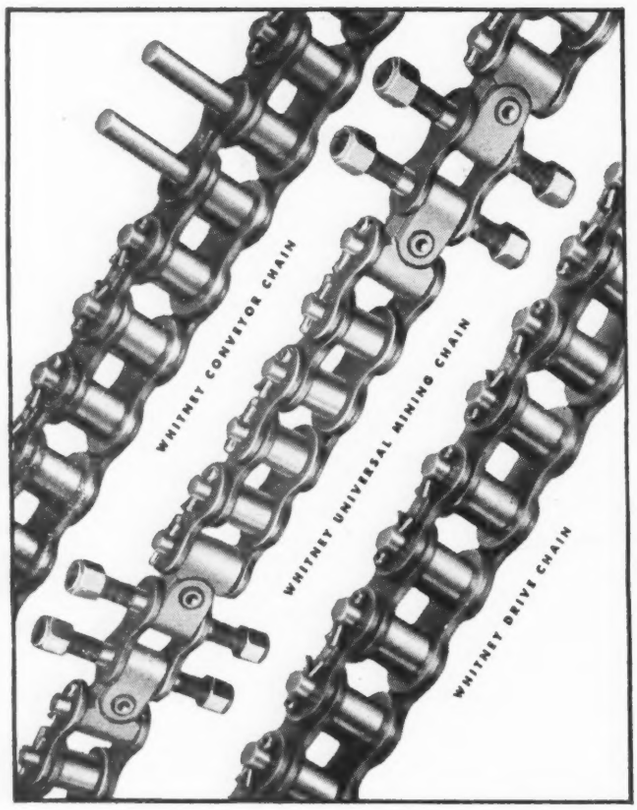
GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

ABOVE OR BELOW GROUND



WHITNEY CHAIN DRIVES

are tonnage producers



Whitney chain . . . loader, conveyor or drive . . . is one investment that will pay out daily profits.

Made of selected heat-treated alloy steel, these tough, rugged chains keep equipment producing on schedule. They stand up under the severest of operating conditions . . . resisting shock loads without breakage. Whitney Chain Drives help give you lowest cost-per-ton production wherever they are used . . . in the preparation plant or up-at-the-face.

Accurately designed Whitney Cut Tooth Sprockets complete the combination for overall drive efficiency. Like Whitney Chains they are made to insure smooth operation and give long wearing life.

Standardize on Whitney Chains and Cut Tooth Sprockets . . . the all-steel drives . . . and you'll get greater output and less down time.

THE WHITNEY CHAIN & MFG. COMPANY

Your Assurance of Proven Power, Transmission and Conveying Since 1896

210 Hamilton St., HARTFORD 2, CONNECTICUT

See for Yourself...

how Cummins *Dependable* Diesels perform profitably on the toughest kind of jobs. Your Cummins dealer—a specialist in power application—will take you to jobs in your vicinity . . . can show you:

- Equipment of the 101 leading manufacturers who satisfy customer demand with Cummins Diesels as standard or optional power.
- The wide range of jobs on which Cummins Diesels are doing more work at less cost.
- Operation records of Cummins Diesels on jobs like yours.

Acceptance by manufacturers and owners . . . on a wide variety of applications . . . is the strongest evidence that Cummins Diesels offer dependable, economical power for jobs requiring single engines up to 275 hp . . . multiples up to 1440 hp.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA

LUBE MEMO

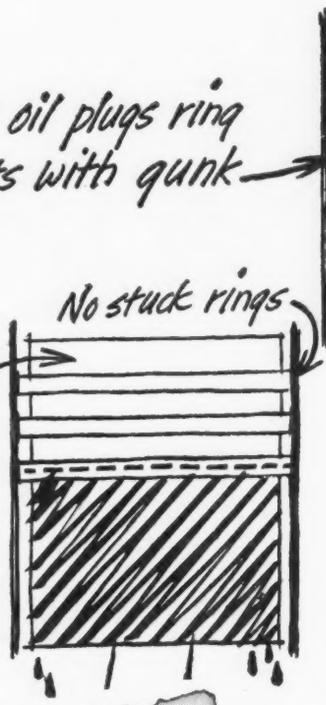
Clogged Oil Ring slots often cause Oil Eaters

Ordinary oil plugs ring slots with gunk

Plugged slots trap oil in combustion chamber where it burns.

No stuck rings

RPM DELO Diesel Engine Lubricating Oil, prevents oil pumping by keeping slots open



RPM DELO Oil is compounded to keep oil ring slots clean 3 ways!

1. Resists formation of gum and lacquer.
2. Removes carbon deposits.
3. Holds contaminants in suspension—flushes them out when oil is changed.

Get RPM DELO Oil at next oil change

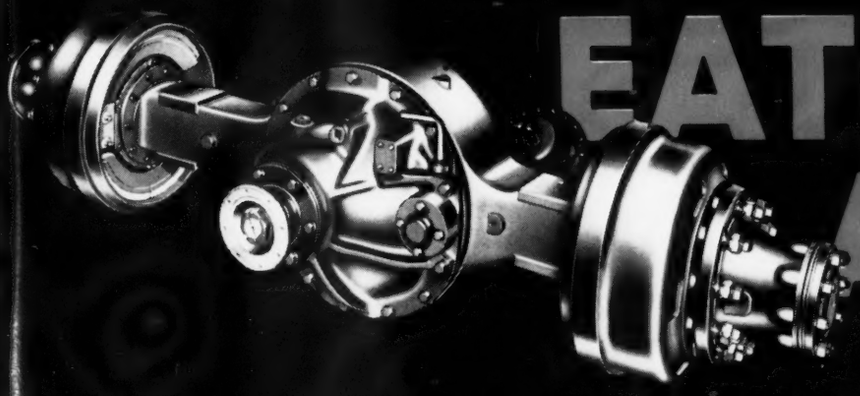
DIESEL ENGINE RPM DELO LUBRICATING OIL

DISTRIBUTED BY
Gordon Lubricating Company
In Pennsylvania, Ohio, West Virginia, Kentucky
1023 Oliver Bldg., Pittsburgh, Pa. At. 5172
Andover Road, Columbus, Ohio
Kingswood 1495

DISTRIBUTED BY
Transcentral Oil Corporation
In Indiana, Illinois, Missouri, Michigan
600 S. Michigan Ave., Chicago, Ill.
HAR. 2677
Indianapolis, Ind. Market 1401

Eaton Forced-Flow Oiling System Starts Lubrication the Instant Gears Turn Over

The instant the gears in the Eaton 2-Speed Truck Axle turn over—even a single revolution—oil is started on its way to all moving parts. Planetary gears operate in a bath of oil. There is no operation without lubrication. The flow of lubricant is governed to meet the demands of various operating speeds. This assurance of abundant lubrication at slow speeds as well as high, reduces friction and wear on moving parts, and adds materially to axle life and freedom from repairs. Outstanding performance records are proof of Eaton quality and design. See your truck dealer for complete information.



EATON *2-Speed Truck* AXLES

ALMOST A MILLION EATON 2-SPEED AXLES IN TRUCKS TODAY

EATON MANUFACTURING COMPANY

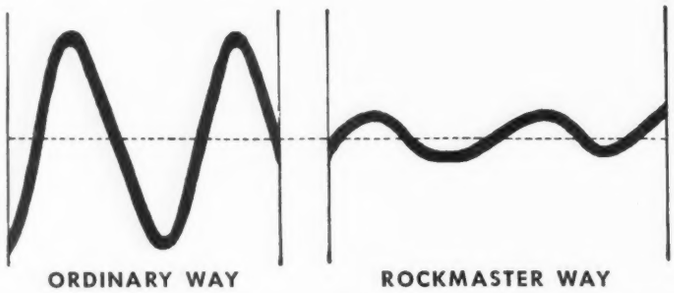
Axle Division

CLEVELAND, OHIO

Through Better Use of Energy

ROCKMASTER

Stopped Objectionable Vibration on This Job



ORDINARY WAY | **ROCKMASTER WAY**

An 11 hole blast using 3300 lbs. of dynamite fired by ordinary methods produced this reading on a seismograph used to record the vibration.

This ROCKMASTER blast used 12 holes and 3575 lbs. of dynamite, yet the seismograph reading showed only one-third the amount of vibration.

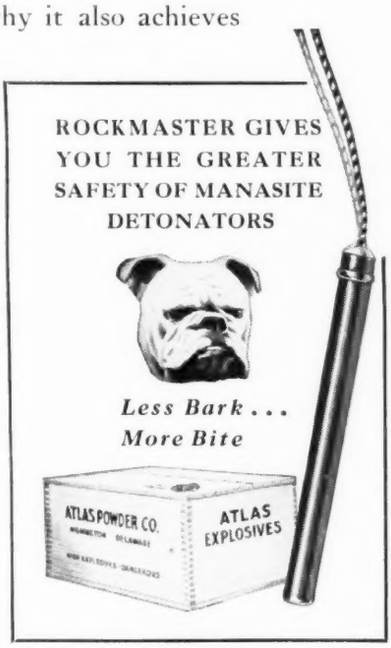
The vibration record of two comparable blasts, one fired by the Rockmaster blasting system and one by ordinary methods, is shown above. It is easy to see how important this reduction in vibration is to quarries, construction jobs and coal stripping pits that operate near residential communities.

and **ROCKMASTER** cuts costs, too!

The Rockmaster system splits up a big blast into smaller ones, staggered milli-seconds apart. That's how it controls vibration. And that's why it also achieves these other important money-saving results!

1. ***More rock ready for the shovel.***
2. ***Better fragmentation***—less secondary blasting.
3. ***Far less "back-break"*** in quarries. Less pulverizing of coal in strip pits.
4. ***Wider spacing of drill holes*** can frequently be used, saving drilling costs and explosives costs.
5. ***Better control of "throw."***

Call in the Atlas representative today. He will be glad to give you the benefit of Atlas pioneering in milli-second delay blasting.



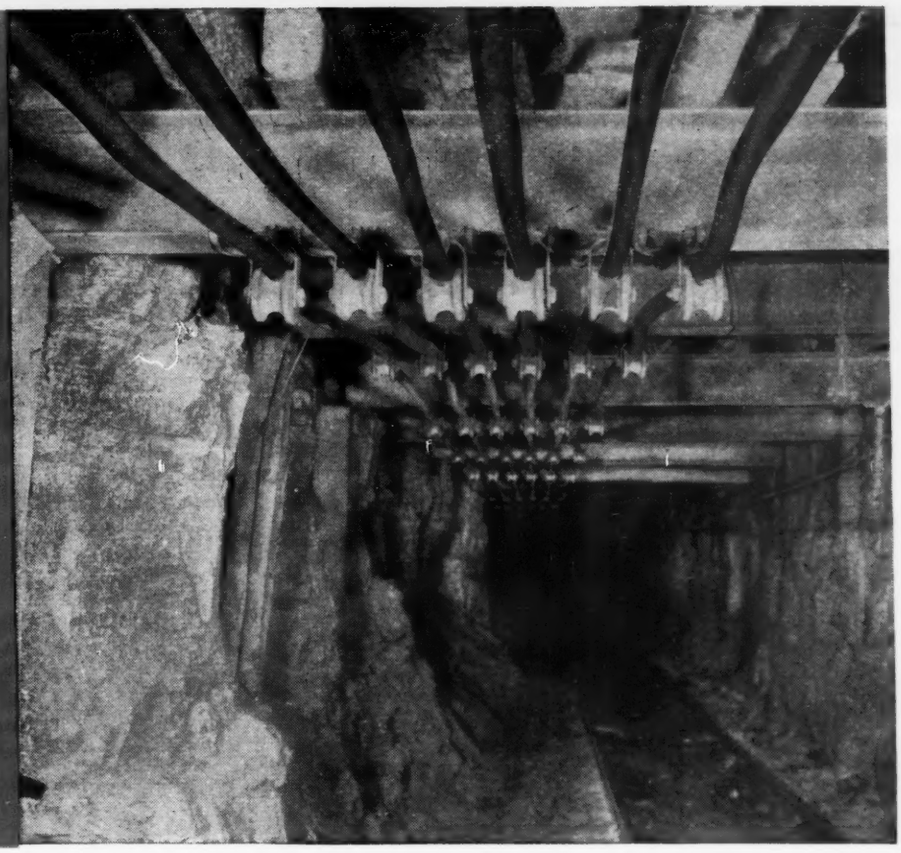
"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES
"Everything for Blasting"

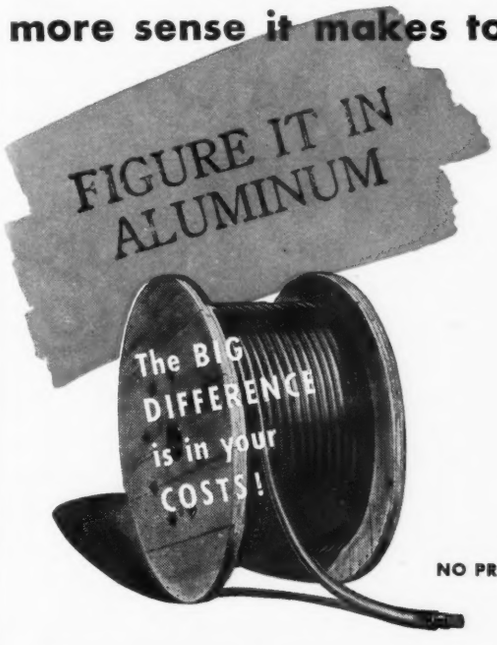
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

POWER and FEEDER CABLE ?



The more you use, the more sense it makes to



No wonder they're calling Alcoa E.C.* Aluminum the conductor of the present and future! Compare weight, for example: A 500,000 cm. insulated cable with aluminum conductor is less than half the weight of an identical copper cable. Aluminum means lower costs all along.

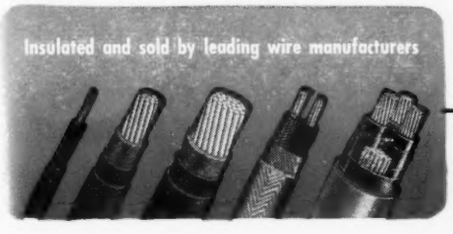
First, figure actual cable costs. Then remember aluminum is easier to handle. Its lighter weight makes it easier to install. Aluminum cable needs fewer supports. It's easier to move, when necessary. It resists corrosion by acid mine water.

Alcoa supplies E.C. Aluminum Conductor to leading wire and cable manufacturers who draw, strand, and insulate it and sell it under their own trade-marks. Your wire supplier should have it in stock.

ALUMINUM COMPANY OF AMERICA, 1763 Gulf Building, Pittsburgh 19, Pennsylvania.

NO PROBLEMS of conductivity **NO PROBLEMS** of joints and terminals **NO PROBLEMS** of conduit layout

AND YOUR SUPPLIER HAS IT!



*E.C.: *Electrical Conductor* Aluminum

ALCOA EC ALUMINUM

FOR ELECTRIC WIRE AND CABLE

BOWDIL FABRI-FORGED CUTTER CHAIN

The Fabri-Forged Cutter Chain is another development by Bowdil, brought to a high degree of perfection by modern production methods, metallurgical knowledge and heat-treating practice.

Designed for maximum, trouble-free service and constructed throughout of highest quality materials, carefully selected and processed, it will give long satisfaction on all types of cutter heads and under all kinds of service conditions.

Despite its great strength and ruggedness and numerous advantageous design features, Fabri-Forged Cutter Chain is no heavier than other chains and is easy to maintain.

Used in hundreds of mines throughout the coal fields of the nation, it has set the standard for cutter chain performance and won the approval of operators everywhere.

WHY *FABRI-FORGED* CUTTER CHAIN saves time and reduces costs *6 WAYS*

1. **Less Wear and Damage to Guides and Wearing Strips.** Bowdil's true-running radial track guide makes the chain circle the head at the correct angle, giving a smooth, wobble-free run that minimizes wear and prevents damage to guides and wearing strips.

2. **Extra Strength.** The drop-forged lug bodies and connectors are of equal strength . . . strong enough to withstand many times normal loads. There are no weak spots in Fabri-Forged Chain.

3. **Easy to Maintain.** Bowdil design makes removal, replacement and connection quick and easy. The simple, ingenious rivet lock principle makes it easy to remove the pin and bushing yet holds the assembly securely.

4. **Fast Bit Replacement.** Bowdil's one-piece holder wedges the bit securely in the lug projection. Individual replacement bits can be quickly and easily inserted and locked in position by means of a set screw with-

6 WAYS, CONTINUED

out removing the link. No need to halt production for complete chain replacement when a few bits become badly worn or broken.

5. **Fits Any Job.** Bowdil's bit-carrying body is securely welded on the chain to meet any requirement for position, lacing or kerf.

6. **Long Life.** Large alloy steel pins and bushings, heat treated for maximum resistance to wear, take the wearing action. Heavy shoulders on links and lugs carry the load and shock . . . distribute stress . . . lengthen the life and increase the efficiency of the entire cutting end of the machine

ONE-PIECE BIT HOLDER
SET SCREW LOCKS BIT HOLDER
BIT-CARRYING BODY SECURELY WELDED TO CHAIN
HEAVY SHOULDERS ON LINKS CARRY LOAD
LARGE HEAT-TREATED PINS
DROP-FORGED LINK AND CONNECTOR
INGENIOUS RIVET LOCK
RADIAL TRACK GUIDES
HEAVY-WALL HARDENED BUSHING

THE
BOWDIL
COMPANY
CANTON, OHIO

UNION PACIFIC

The Governor of Idaho *invites You*

STATE OF IDAHO
OFFICE OF THE GOVERNOR
BOISE

C. A. ROBINS
GOVERNOR

To American Industry:

Idaho is a state of vast undeveloped resources but nevertheless ranks high as a producer in agriculture, mine and forest. Unlimited opportunities for industrial expansion through the processing of these products exist in widely scattered parts of the state. Population shifts to westward serve to emphasize the desirability of this sort of development in Idaho where water, power, location and transportation combine to afford the finest of opportunities.

Expanding reclamation activities, a marvelous climate and an energetic and progressive citizenry enhance the value of these opportunities. Come to Idaho, Gem of the Mountains!

C. A. Robins
Governor

C. A. Robins

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho; Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

*Address Industrial Department, Union Pacific Railroad
Omaha 2, Nebraska

UNION PACIFIC RAILROAD

Road of the Daily Streamliners

A Better Angle on Cable Flexing...

AND YOUR CABLES WILL LAST LONGER

IN CABLES
the "Bends" Can Be Fatal, Too!
Here Lies a Mine Cable
Sharp bends around rough objects can "kill" a mine cable long before its time. Give the cable on your equipment a break. You can't tie a cable in "knots" and expect it to live.

THE SHARPER THE BEND...
THE TOUGHER THE STRAIN
Even a mine cable can get "sore" inside from severe twisting and flexing. Avoid sharp bends and twists under tension. Don't "yank" your power line, it can hurt the "insides" of any cable.

Sure, Rome 60 Mining Cables are designed for extreme flexibility and experience has proved that they stand up under rough treatment. However, a "flex is a flex," and a "bend is a bend" . . . Your cables will have greater life if kinks and sharp bends are avoided. Besides, a broken cable is a dangerous one.

WATCH THOSE CURVES
In Your Cable, That Is
Don't let the curves throw you for a "loop." They could, you know . . . there is plenty of "juice" in that cable. Prolong its life by straightening it out.

To help you get these messages across to the men in your mines, posters like those illustrated are available, free of charge. These posters, free of any advertising and in convenient 11" x 14" size for bulletin board use, are offered as a service to the mining industry and in the interest of mine safety and economical operation. You simply need to use the coupon below, or write to Department C, Rome Cable Corporation, Rome, New York, for your requirements.

FROM BAR TO FINISHED WIRE

ROME CABLE
CORPORATION
ROME • NEW YORK

ROME CABLE CORPORATION
Dept. C Rome, New York

Please send me ..... each of three Safety Posters on Cable Flexing for use in our mines.

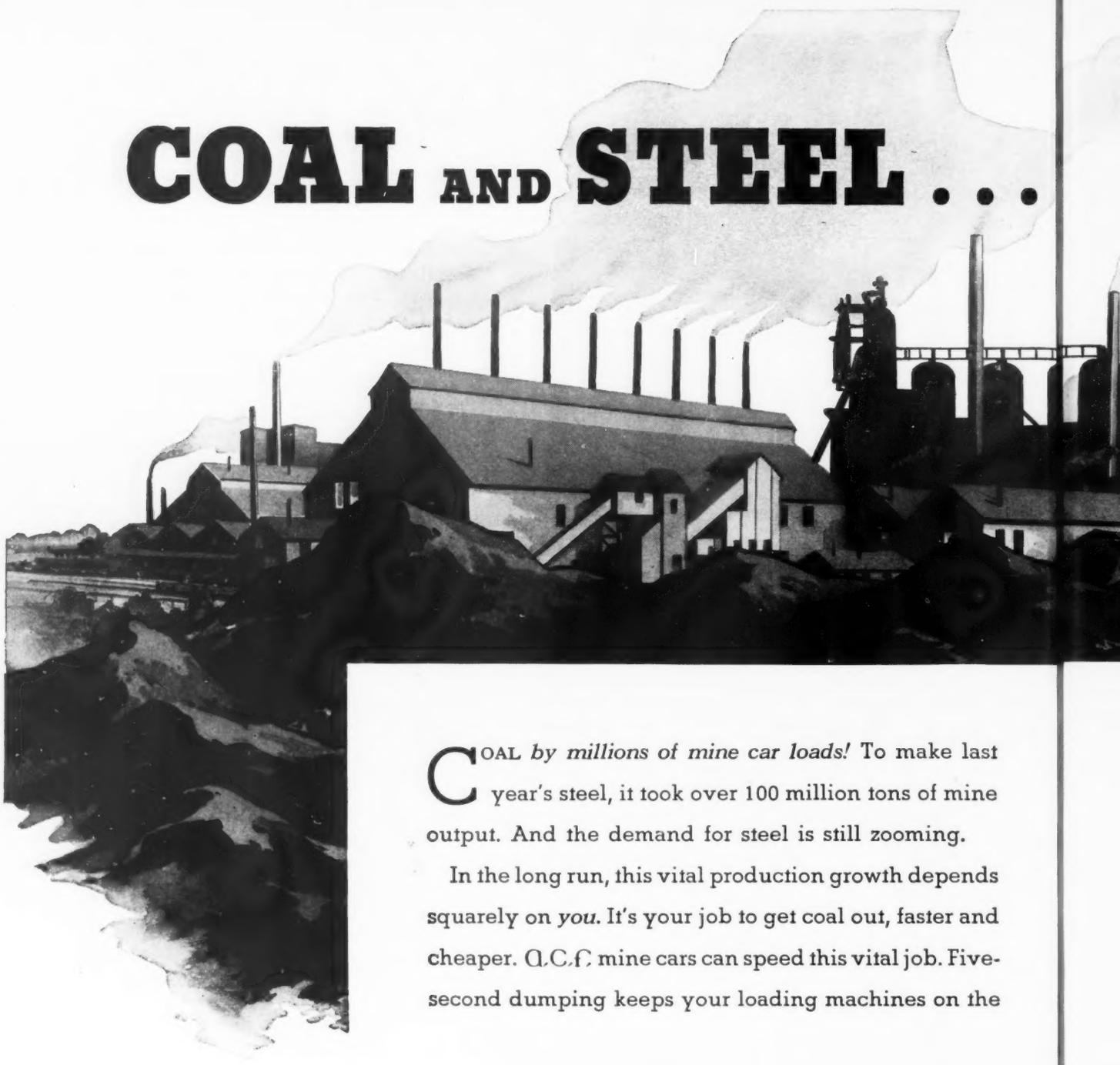
Name ..... *Title* .....

Company .....

Street .....

City ..... *State* .....

COAL AND STEEL . . .



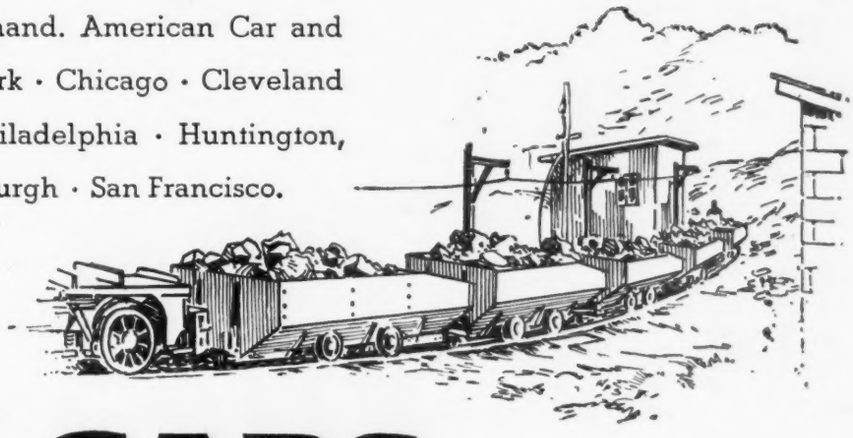
COAL *by millions of mine car loads!* To make last year's steel, it took over 100 million tons of mine output. And the demand for steel is still zooming.

In the long run, this vital production growth depends squarely on *you.* It's your job to get coal out, faster and cheaper. A.C.F. mine cars can speed this vital job. Five-second dumping keeps your loading machines on the

a.c.f.

TWIN KEYS TO INDUSTRIAL EXPANSION

go. No more expensive waiting for mine cars to get back in the mine! Talk over your coal-hauling problems with an A.C.F. Sales Representative. There's one near you, ready to lend a hand. American Car and Foundry Company, New York · Chicago · Cleveland Washington · St. Louis · Philadelphia · Huntington, W. Va. · Berwick, Pa. · Pittsburgh · San Francisco.



MINE CARS

for Greater Coal Output

AMERICA NEEDS MORE COAL

No Need to wait for

	B TOURNADOZER 300 hp Diesel	B TOURNAPULL 225 hp Diesel
Engine		
Speeds		
1st gear	Fwd. and Rev. 1.6	Fwd. and Rev. 2
2nd gear	Fwd. and Rev. 3.3	Fwd. and Rev. 4
3rd gear	Fwd. and Rev. 6.8	Forward 8
4th gear	Fwd. and Rev. 13.6	Forward 16
Tires	24.00 x 29	24.00 x 29
Control	Tournatorque electric	Tournatorque electric
Transmission	Constant Mesh-Tournamatic	Constant Mesh-Tournamatic
Drive	4-wheel	2-wheel
Working Weight	25 tons	22 tons empty
Load Capacity	Blade: 5½ cu. yds. top soil	Scraper: 30 yards (35-ton load limit)

(Specifications subject to change without notice)

Tournapull—Trademark Reg. U.S. Pat. Off. CM14
Tournadozer—Trademark

R.G. LeTOURNEAU LeT EQUIPMENT

TOURNAPULLS

BIG STRIPPERS

HERE is a new ***big production*** stripping outfit you can get for delivery this season. These big 30-yard "dragline buckets" on rubber tires are ready to take your top lifts or, in shallower pits, to strip to the vein right now . . . eliminate need for you to delay strip expansion and make equipment commitments four or five years ahead.

These self-propelled Scraper units because of their flexibility in operation and unlimited range of dirt-moving give you an overall economy of strip-pit operation that in many instances will give a cost-per-yard comparable to stripping with big shovels and draglines.

A fleet of three of these giant, high-speed, 225 h.p. B Tournapulls, plus their big 300 h.p. B Tournadozer pusher, costs less than one third the price of a big stripper. They'll load out around 30 heaped yards in a minute . . . haul material anywhere you want it at traveling speeds up to 16 m.p.h.

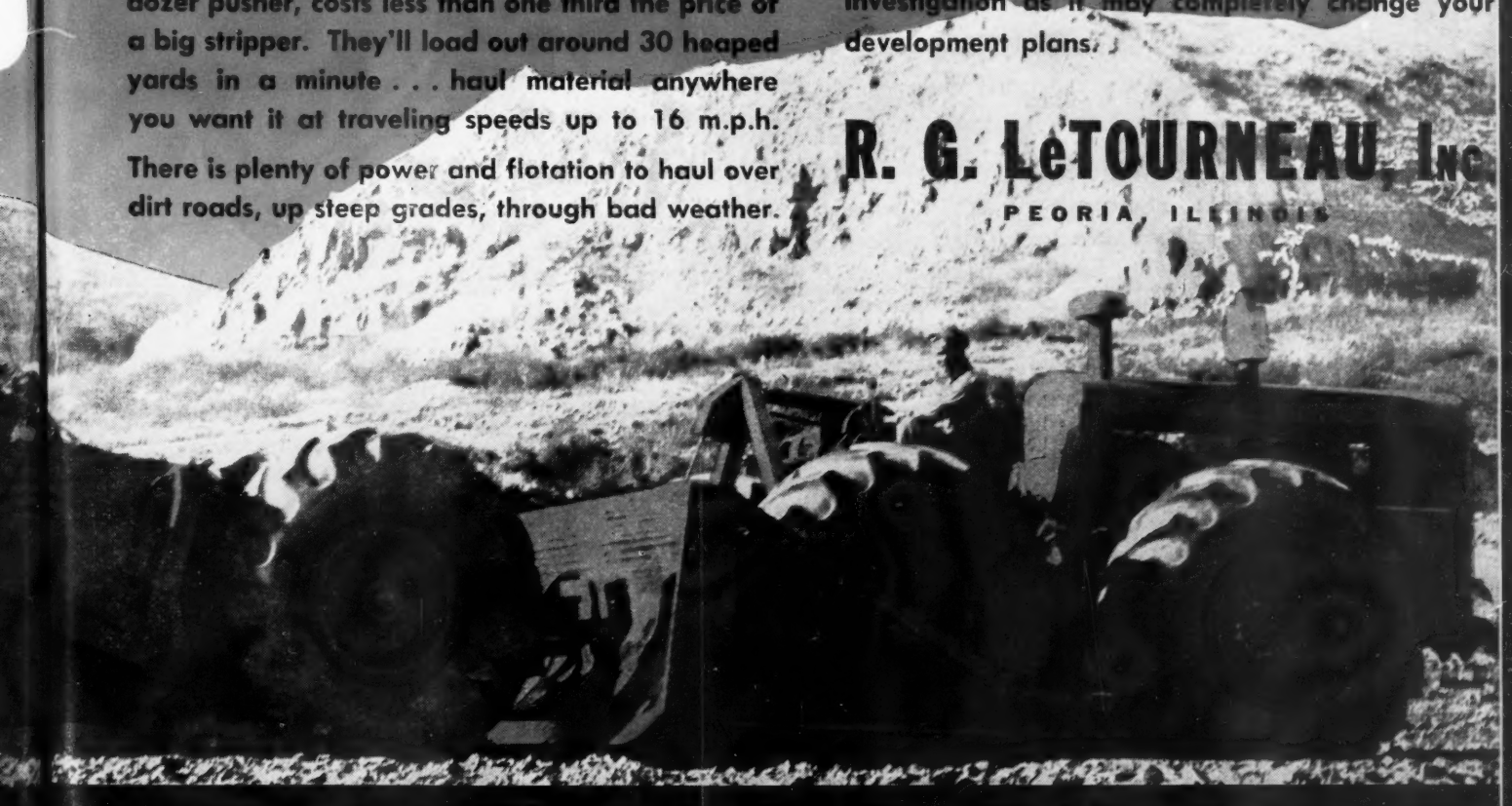
There is plenty of power and flotation to haul over dirt roads, up steep grades, through bad weather.

Dirt can be spread in level dumps, used to fill between spoil banks. Top soil can be removed separately, stockpiled, and later replaced to preserve fertility of land for resale.

Both Tournapull and Tournadozer roll on big rubber tires, can operate directly on seam without damage to coal . . . can be driven at high speed anywhere around the mine or over highways to other pits. Ready now to handle major stripping assignments, they will always be handy to take off high points in overburden, to open box cuts, to level spoil piles, or to haul coal.

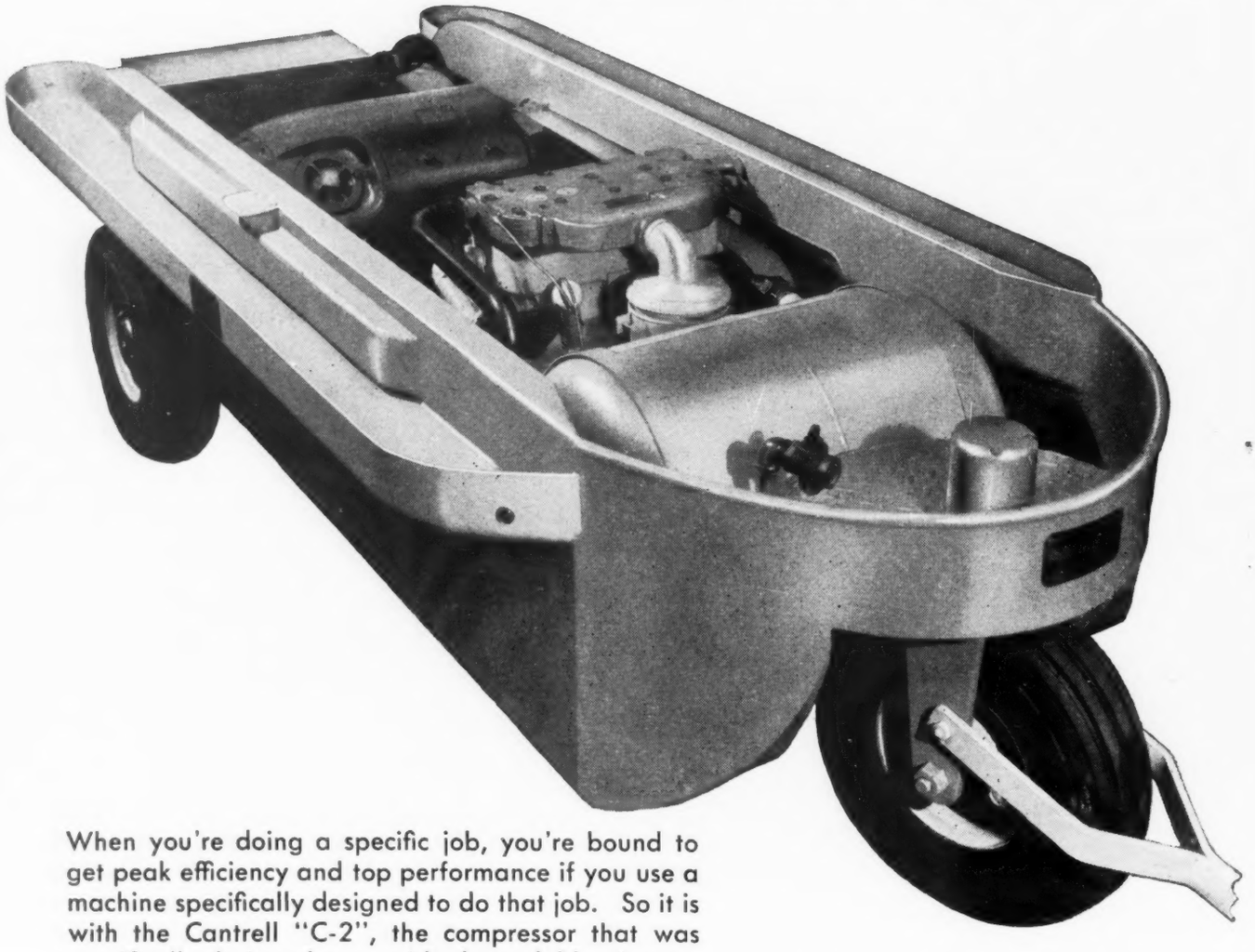
Call your nearest LeTourneau Distributor for complete information today . . . this is worth immediate investigation as it may completely change your development plans.

R. G. LeTOURNEAU, Inc.
PEORIA, ILLINOIS



TOURNADOZERS

FOR TOP PERFORMANCE IN TRACKLESS MINES CHOOSE THE CANTRELL "C-2" COMPRESSOR...



The Cantrell Type "C-2" Air Compressor with safety top removed. When safety top is in place, machinery is enclosed and protected, top, bottom and sides. Note the trays for drill steel and tools.

When you're doing a specific job, you're bound to get peak efficiency and top performance if you use a machine specifically designed to do that job. So it is with the Cantrell "C-2", the compressor that was specifically designed to provide dependable air compressor service in any part of a trackless mine. Like all Cantrell Compressors, the "C-2" is engineered by men who know the operating problems of mining and what it takes in a compressor to do a satisfactory job. The Cantrell "C-2" is easier to handle, easier to transport . . . an all around superior compressor for trackless operations, or for general service at any mine.

Imperial-Cantrell builds a compressor for every requirement of track, trackless or stationary use. Write today for information on the complete line of Cantrell Compressors.

IMPERIAL-CANTRELL Mfg. Co.
JELLICO TENNESSEE

Cantrell COMPRESSORS

IT'S EASY to see that the size of the valve is out of proportion—but not so much if you think of *all valves* in this building as *one valve.* Collectively, valves represent an investment bigger than the cost of many large units always carefully chosen for operating economy.

That's why, today, with maintenance wages and material costs higher than ever before, alert management must keep a sharp eye on valve performance.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but, multiplied by thousands, it becomes a serious drain on operating budgets, and often contributes to slowdowns that reduce productivity.

JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, or maintenance.

For all new installations, for all replacements, rely on Jenkins quality and engineering service for lowest valve costs in the long run. *Sold through leading Industrial Distributors everywhere.*

•

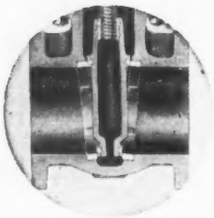
Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco.
Jenkins Bros., Ltd., Montreal.

"PREVENT VALVE FAILURE" is a 28-page guide to valve economy, fully illustrated, with case histories of valve damage, and recommendations for its prevention by proper selection, installation, inspection, and maintenance. FREE on request. Write: JENKINS BROS., 80 White St., New York 13, N. Y.

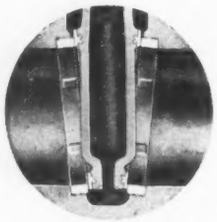
LOOK FOR THIS TRADE JENKINS MARK DIAMOND MARK
SINCE Jenkins Bros. 1864

JENKINS VALVES

Types, Sizes, Pressures, Metals for Every Need

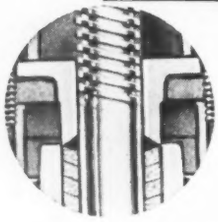


Straight-Flow Port Design reduces fluid turbulence to a practical minimum.



Seat Rings of end-seated typ are screwed into the body.

Sure-Grip Malleable Handwheel for non-skid gripping even with heavy gloves.



Brass Liner on Glands assures greater resistance to corrosion and scoring.

WALWORTH

iron body gate valves

with screwed or flanged ends

... 8 Outstanding Features

For complete information on these new Walworth Iron Body Valves, see your local Walworth distributor, or write for bulletin 106.

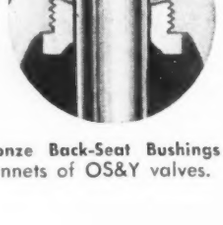
WALWORTH

valves and fittings

60 EAST 42nd STREET NEW YORK 17, N. Y.

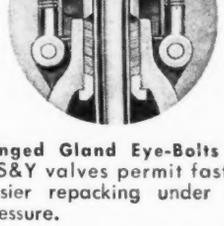
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

T-head Disc-to-Stem connection on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.

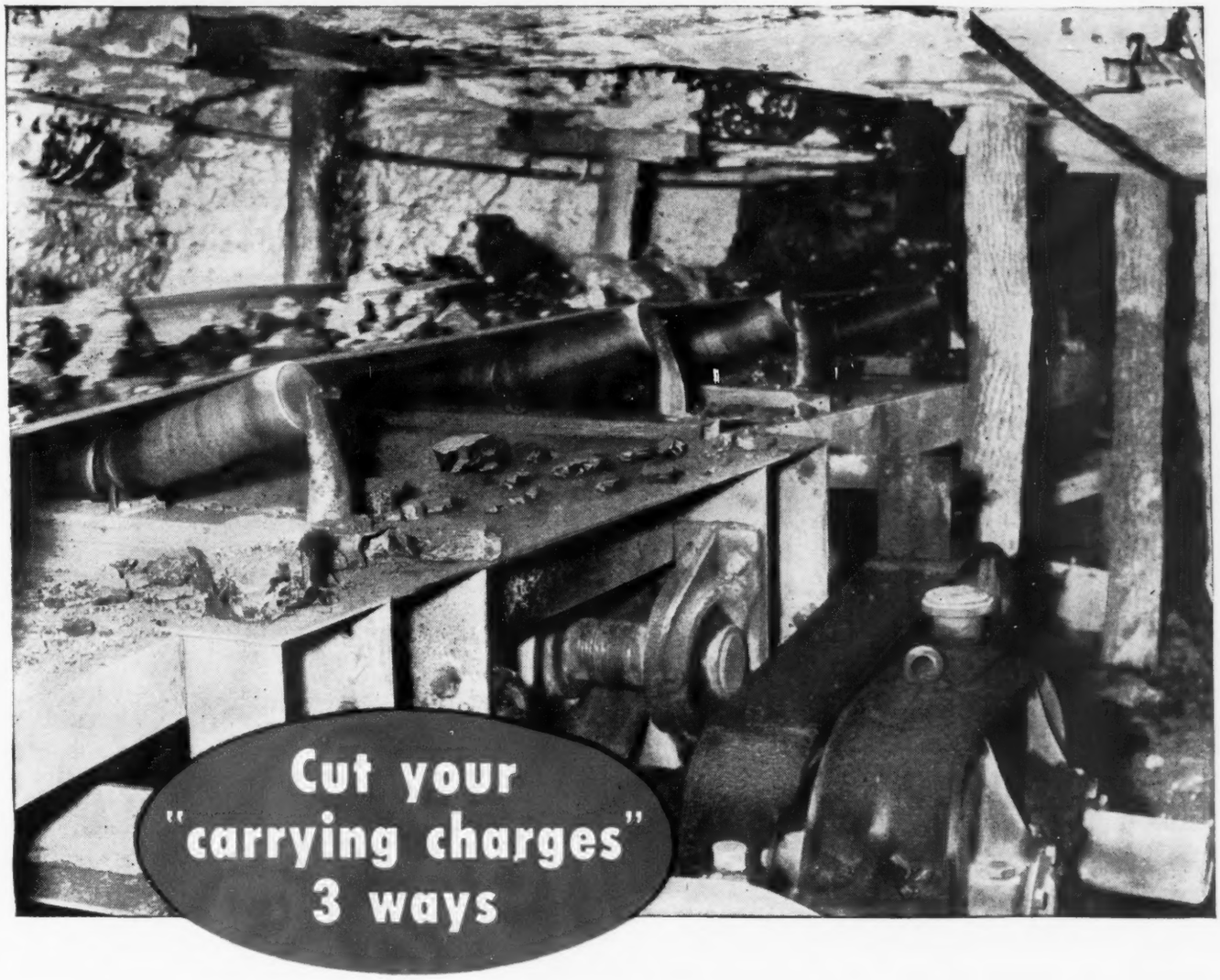


Bronze Back-Seat Bushings in bonnets of OS&Y valves.

Solid Web Type Disc in OS&Y valves for greater strength and longer service.



Hinged Gland Eye-Bolts on OS&Y valves permit faster, easier repacking under full pressure.



Reduce spillage, maintenance, wear . . . move more tons per dollar . . . with Hewitt conveyor belting

Take a tip from other wide-awake operators.

Cut your "carrying charges"—the cost of moving coal from your mine toward the surface—with Hewitt conveyor belting. You'll save these three ways:

FIRST—Minimum spillage gives you a tonnage bonus. Balanced construction makes Hewitt's Ajax Conveyor Belting trough just right. This helps keep the hose "on the track," whether fully loaded or empty.

SECOND—Minimum maintenance is assured by high-strength, heavy-woven fabric permanently bonded by specially developed rubber compounds. Ajax Belt is extra-strong to support peak loads and over-sized lumps safely. And it's protected against mildew and acids.

THIRD—Minimum wear is provided by a thick cover of finest quality, abrasion-resistant rubber.

Hewitt Belting on an efficient Robins Mine Conveyor makes the perfect combination. Only Hewitt-Robins offers you unified responsibility for *both* belting and conveyor.

To check rising costs, check Hewitt about this thriftier way to move coal. Write *today*. Address Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, New York.

HEWITT
CONVEYOR BELTING
(AJAX BRAND)

Check these advantages of Hewitt Conveyor Belting

1. ***Abrasion-resistant*** cover is made of extra-tough rubber. Rigid-edge construction prevents curled edges caused by misalignment during conveying operations.
2. ***Stretch-resistant*** duck fabric of high-tensile cotton gives this belt unusual strength combined with high flexibility.
3. ***Mildew-resistant*** treatment protects fabric against deterioration . . . assures longer belting life underground.
4. ***Acid-resistant*** rubber compounds neutralize effects of destructive ground acids.

HEWITT RUBBER DIVISION, HEWITT-ROBINS INCORPORATED. MAKERS OF INDUSTRIAL HOSE • BELTING • PACKING

No other truck combines such { **POWER**
TRACTION
RUGGEDNESS

Model AWUS - 300 H.P.
WALTER TRACTOR TRUCK

★ ***POWER*** Supplied by 300 hp. butane, 260 hp. diesel or 250 hp. gasoline engine.

★ ***TRACTION*** Every horsepower is converted into 100% traction in four driving wheels, by exclusive 4-Point Positive Drive.

★ ***RUGGEDNESS*** Built like a battleship throughout. Tractor type transmission withstands all strains.

Unequalled for high-tonnage hauling under severest running conditions

The fact that Walter Tractor Trucks haul payloads of 30, 40, up to 60 tons, is only part of the story. What sets them apart from all other trucks, is the fact that Walter Tractor Trucks haul these huge loads on or off the road, up steep grades, under all conditions—and at speeds equalling much smaller trucks.

The big advantage of Walter Tractor Trucks is in the never-failing, non-slip traction in 4 driving wheels, under all conditions. Where other drive systems waste power on slipping wheels which spin helplessly, the Walter 4-Point Positive Drive concentrates power only on the *working* wheels, eliminating wheel spinning.

Iron and coal mines using Walter Tractor Trucks credit these units with the greatest tonnage hauled per day—lowest cost per ton—higher availability—less wear and tear on tires and mine roads. Learn more about these outstanding open pit mine trucks. Write today for detailed literature and name of nearest dealer.

WALTER MOTOR TRUCK CO.
1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

WALTER
TRACTOR TRUCKS

Gulf Lubrication Engineers recommend

Gulf Mining Machine Lubricant B

for cutting and loading machines—

TIME AND AGAIN, Gulf Lubrication Engineers have helped eliminate mechanical troubles, increase tonnage, and reduce maintenance costs with this quality lubricant.

The body of Gulf Mining Machine Lubricant B prevents loss through leakage—keeps abrasive coal dust from entering gear cases. The superior lubricating qualities protect against excessive wear in gears and bearings. The exceptional adhesive properties insure full coverage of bearing areas—prevent throwoff or channeling. The high resistance to the washing action of water insures effective lubrication under water conditions.

Then Gulf Mining Machine Lubricant B is equally effective for plain and anti-friction bearings and for gears in drives and transmissions. Thus, it helps simplify lubricant storage and handling — by reducing the number of lubricants needed.

Call in a Gulf Lubrication Engineer today and ask him to demonstrate the time-saving, cost-cutting advantages of this quality product. Write, wire, or phone your nearest Gulf office.

GULF INDUSTRIAL LUBRICATION

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

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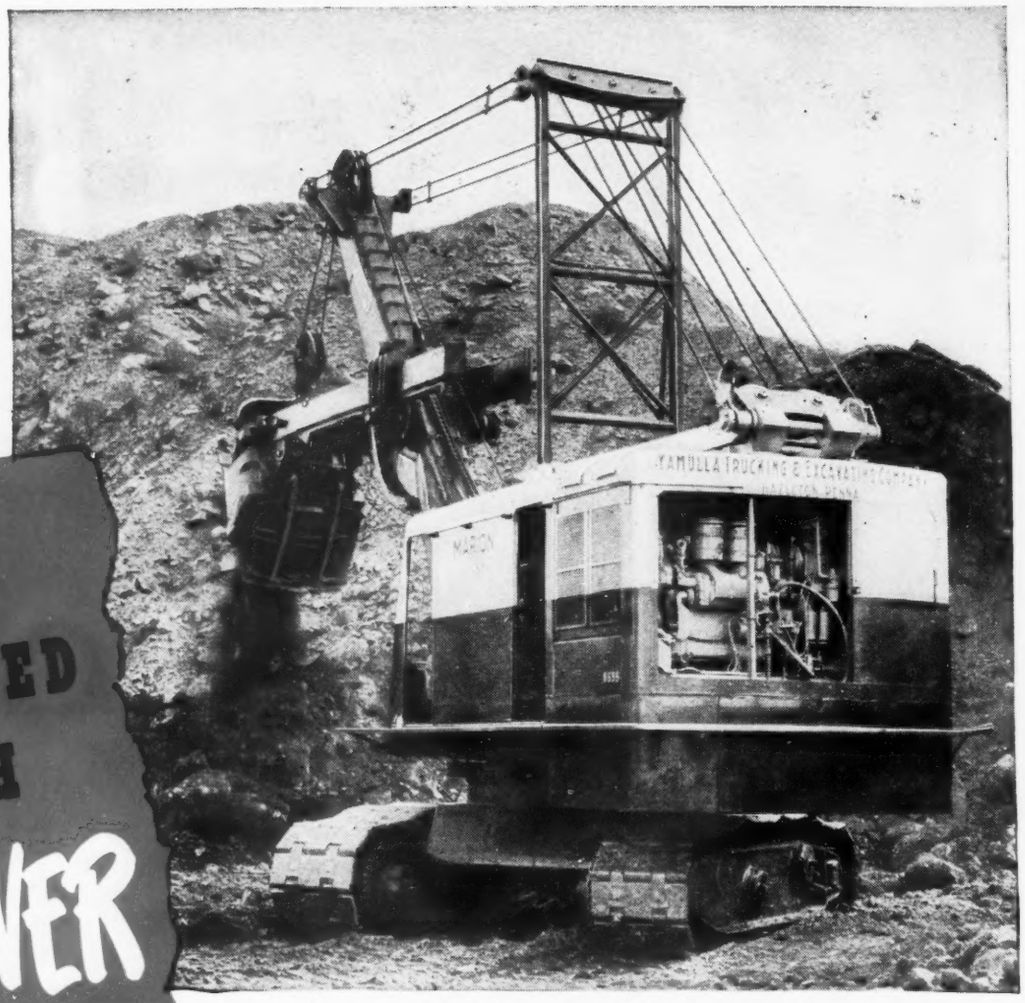


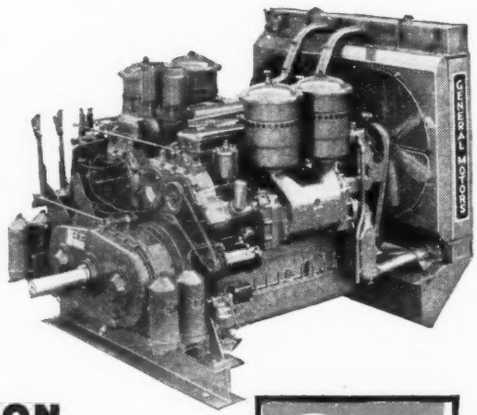
JUST CRAMMED WITH POWER

Marion 111-M 3½ cu. yard shovel strip mining for Yamulla Trucking and Excavating Company of Hazelton, Pennsylvania.

TAKE the case of the Marion 111-M 3½ cu. yard shovel. Here's equipment that calls for plenty of power fitted in a compact cab. This is where a General Motors "Twin" does a masterful job, because it makes available 330 husky, dependable horsepower.

Of course, the Yamulla Trucking and Excavating Company like their new shovel. The smooth electric swing, the snappy mechanical scoop, the economy of fuel and the dependability of its GM Diesels would please any shovel operator.

Discover what GM Diesel power can do for you as a prime mover or in fine contractor's equipment. Get the story from your local GM Diesel dealer or write direct to us.



DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES.. Up to 200 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS.. Up to 800 H.P.

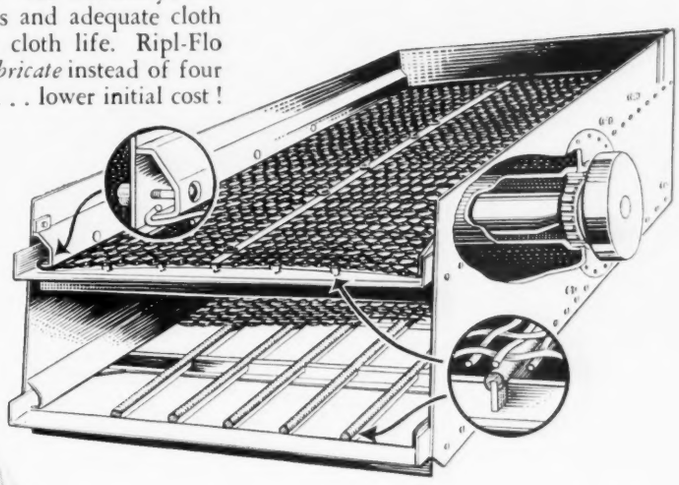
GENERAL MOTORS

GM
GENERAL MOTORS
DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

"Two Main Things I want to know about Any Vibrating Screen!"

1. HOW IT'S BUILT: Take a close look at Ripl-Flo screen if you want to see long-life construction! Made of high strength alloy steel with all welded parts "stress-relieved" for durability. Accurately crowned support frames and adequate cloth supports greatly increase screen cloth life. Ripl-Flo screen has only *two bearings to lubricate* instead of four — less weight and maintenance . . . lower initial cost!



2. HOW IT WORKS: If you could watch a Ripl-Flo screen run you'd see a very rapid stratification and an *even* bed depth of material. Eccentric mechanism imparts a *balanced* circle throw motion to *every part* of screen surface. Every Ripl-Flo screen is tested before shipment for correct balance, throw, bearing temperature. You can change screen surfaces easily . . . because clamping plate adjustment is located *outside* of screen body!

• Ripl-Flo vibrating screens are built by Allis-Chalmers in 15 sizes from 3 x 6 to 6 x 16 ft, with one, two or three decks. Their use has resulted in *more profitable operations* in screening a wide range of materials. Send for Ripl-Flo Bulletin 07B6151B. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2375

RIPL-FLO SCREENS

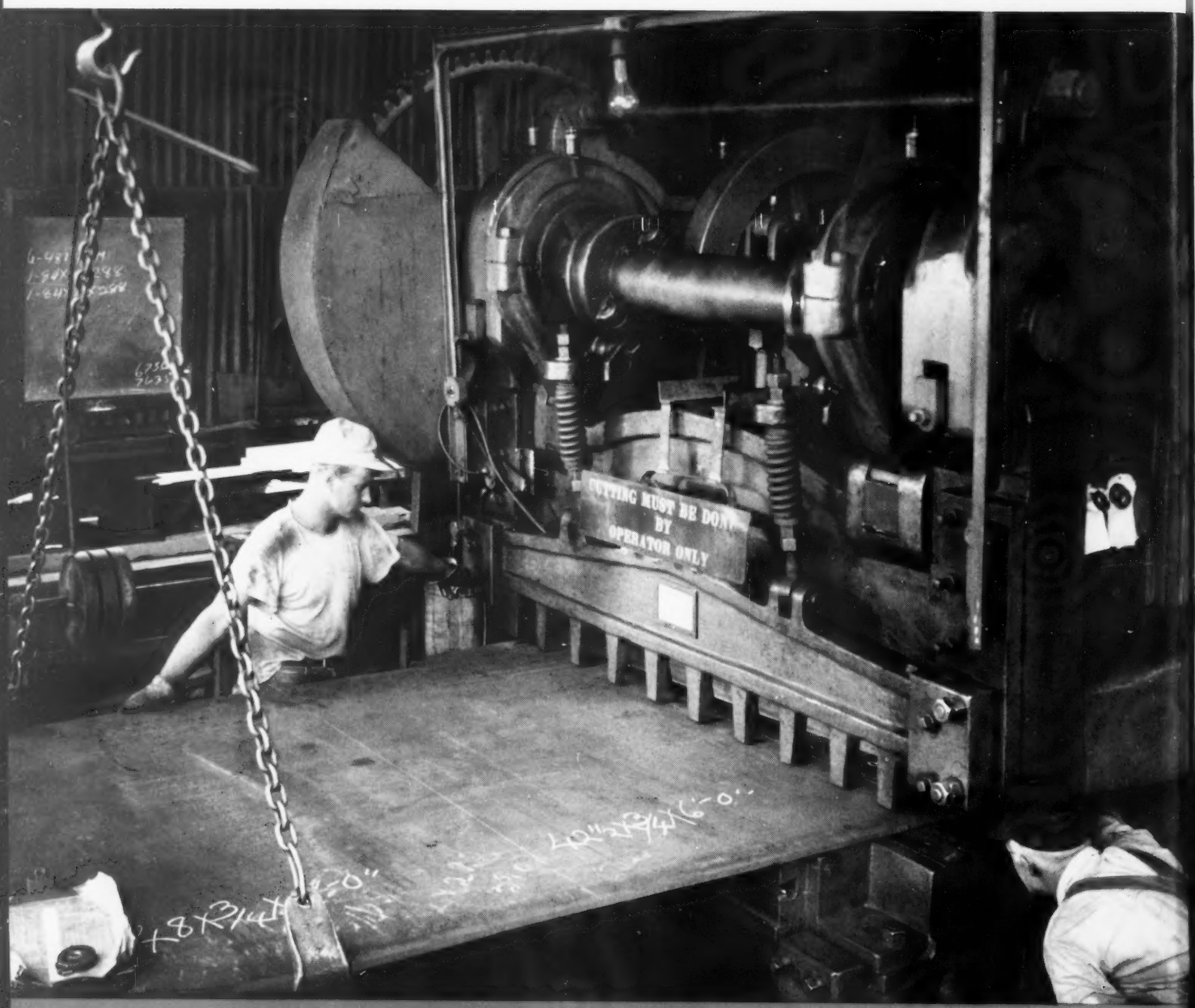
Combine Sound Engineering with Proven Performance!

Ripl-Flo is an Allis-Chalmers Trademark

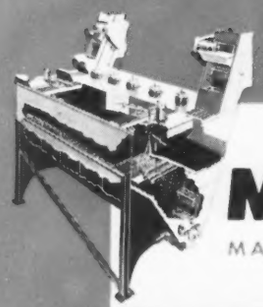
ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

It takes big shop
McNALLY PITTSBURG



Large shear designed for heavy plate work. Note markings on the plate being sheared.



McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—*Plants:* Pittsburg, Kansas; Wellston, Ohio

Engineering & Sales Offices: Pittsburg, Kan. • Chicago (1), Ill. • Pittsburgh (22), Penna. • Wellston, Ohio • Caixa Postal 1310, Rio de Janeiro, Brazil

equipment to build COAL WASHERIES....

...AND IT'S AVAILABLE TO SERVE YOU

Three complete plants are operated by McNally Pittsburg for service to you — two at Pittsburg, Kansas, and one at Wellston, Ohio.

The photographs here will give you an idea of the size of the equipment that serves the coal industry.

The facilities at Pittsburg, Kansas, include:

— a coal laboratory for testing coal samples

— a fully staffed engineering department

— the most modern process iron foundry in the central west

— a complete machine shop and a complete fabricating shop.

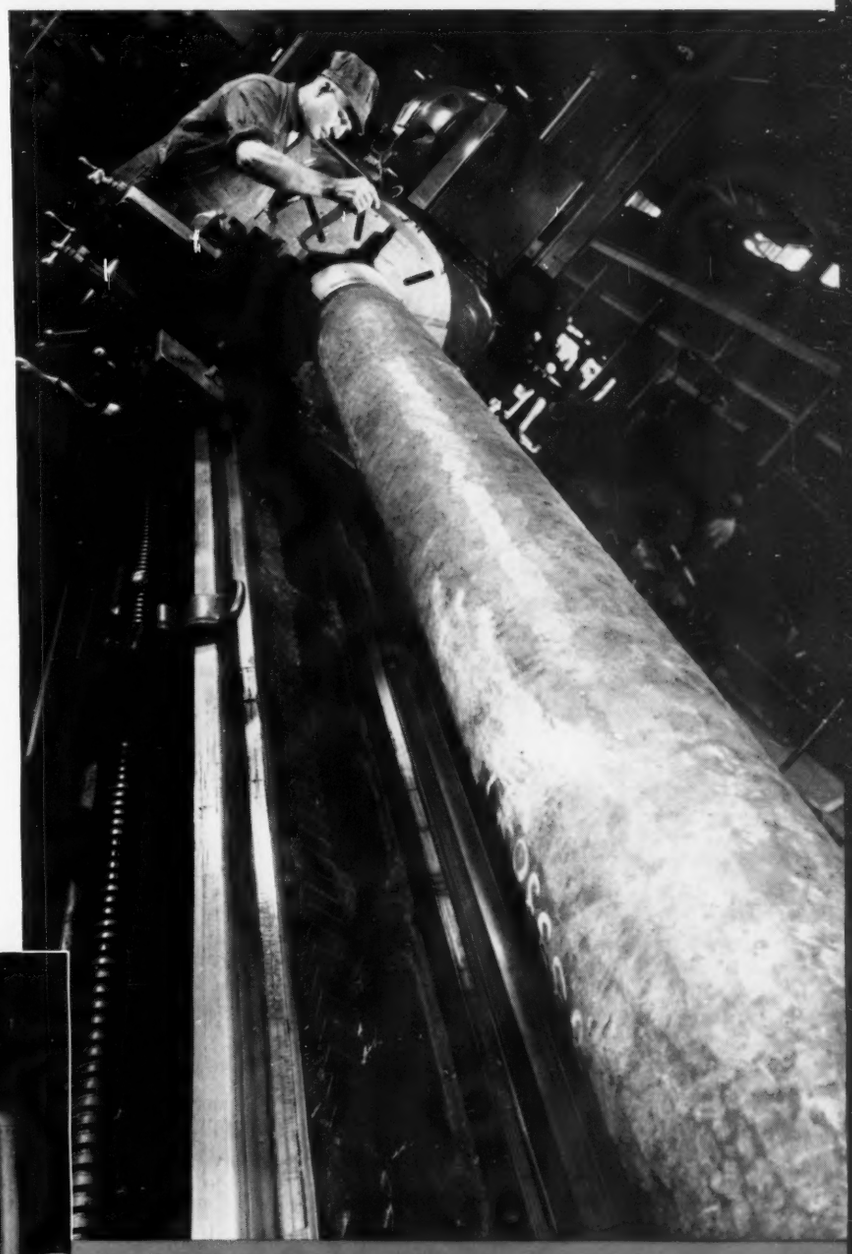
The facilities at Wellston, Ohio, include:

— a complete engineering department

— a fully equipped machine shop

— a newly enlarged fabricating shop.

All of these facilities support the work of the field service and construction staff headquartered in strategic offices throughout the coal mining areas of North and South America.



- **Huge lathe where shafts are finished to close tolerances.**

- **Skilled operators are shown in the illustration to the left, forging a steel crankshaft for a high-speed sizing and dewatering screen.**

Immediate shipments from stock

of U·S·S Carilloy Steels

— manufactured to a Guaranteed Minimum Hardenability

If you are a user of alloy steel, it is to your advantage to know that U·S·S Carilloy Steels in our stock are manufactured to a *Guaranteed Minimum Hardenability*.

And when you place an order with us for U·S·S Carilloy Steel you get an additional metallurgical service: *A Heat Treatment Guide which contains complete and specific information about the steel you receive is supplied you with each individual shipment.* This guide gives you *specific* data on the composition, potential physical properties and fabrication of the steel to help you obtain the maximum performance from the steel we furnish on your order.

In addition to these advantages, large and diversified stocks of U·S·S Carilloy Steel make it possible for us to serve your alloy requirements quickly. You are assured of reliable performance when you order alloy steels featuring *Guaranteed Minimum Hardenability*.

SYMBOL OF SERVICE *for Steel Users*

UNITED STATES STEEL SUPPLY COMPANY — USS STEELS — SERVICE

UNITED STATES STEEL SUPPLY COMPANY

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UNITED STATES STEEL

NON-ELECTRIC *Permanent* MAGNETIC SEPARATORS

THE NEW ANSWER FOR TRAMP IRON REMOVAL

ERIEZ Permanent Non-Electric Magnetic Pulleys and plates are being efficiently used to protect coal preparation equipment from tramp iron damage.

The Eriez Magnetic Pulley, used as a head pulley in belt conveyors, and Eriez "GIANT" plate separators installed in chutes ahead of washers, crushers, pulverizers, etc., provide a simple solution for tramp iron removal. Easy to install, economical and powerful, these units designed specifically for cleaning coal have been thoroughly field tested . . .

Eriez Permanent Magnetic Separators can be used under the most severe operating conditions . . . Powered by special giant alnico magnets they require no outside source of power . . . Heat, cold or moisture does not affect their operating efficiency . . .

Eriez Non-Electric Magnetic Equipment is reducing mine operating costs and keeping customer goodwill by protecting processing equipment from damage, recovering expensive tools, and improving quality of coal . . . Your magnetic protection is positive and PERMANENT when you specify ERIEZ.

CLIP AND MAIL TODAY
Please send bulletin No. 102B

We would like to know more about installation of ERIEZ on: CA-4
☐ Gravity Conveyors ☐ Mechanical Conveyors
☐ Equipment on Processing Machines

Name.....

Address.....City.....State.....

● *When It's Magnetic Protection . . . See Eriez First*

Eriez Magnets Are Engineered to Fit Your Equipment.

Eriez EAR' EEZ

ERIEZ MANUFACTURING CO.
60 EAST 12th ST. ERIE, PENNA.

S-D "AUTOMATICS" Can Solve Your Coal Haulage Problems At Great Savings!

Many mines are sacrificing money and efficiency by using obsolete and old fashioned cars when they really need a special type of car to meet their situation. The main function of the engineering staff, here at Sanford-Day, is to analyze these special situations and design a car that gets the largest possible amount of coal out, at the lowest possible cost to the operator. Page after page of letters and reports bear testimony of the tremendous savings hundreds of mines have enjoyed since they installed job-engineered S-D 1-2-3 "Automatics".

Maybe your mine needs a thirty ton, 8 wheel, car like those recently built for the Russell-Fork Coal Co., or perhaps a special car for continuous conveyor loading like the one shown on this page. Regardless of the type or capacity, all Sanford-Day mine cars are designed and built with one idea in mind . . . to save the operator money through efficient, economical operation. If you have a special problem in coal haulage, why not write us today; our engineers will be glad to assist you in any way possible without obligation.

Shown above is a six ton S-D Overlapping End "Automatic". It is equipped with S-D "Floater" Wheels, Westinghouse Air Brakes and Willison automatic couplers. Up at Black Star Coal Company, they pull fifteen of them, or ninety tons of coal, per trip.

Notice in the picture at right how the overlapping end of this car permits continuous loading by conveyor belt without stopping conveyor or cars, and without spillage of coal. It's another tribute to practical Sanford-Day engineering skill.

20 Car loads of "Automatics" from—

SANFORD-DAY IRON WORKS, Inc. • Knoxville 9, Tenn.

Another new mine to produce 4,000 tons daily with modern cars on Timken® bearings

TO help speed production in their new Deerfield Mine, Wyoming County, near Mullens, W. Va., American Coal Company is equipping their new mine cars with Timken tapered roller bearings. 100 of these cars are already hard at work—100 more are on order with more to follow, to enable them to reach a peak production of 4,000 tons of No. 3 Pocahontas coal daily. In this operation, the cars are dumped on the inside of the mine by means of a rotary-type dump as shown; the coal is then conveyed up to the tipple on a Timken bearing equipped belt conveyor.

Timken bearings normally outlast the mine cars in which they are used. They assure easier starting and permit faster operation, reduce friction to a minimum and save considerable lubrication and maintenance time.

With Timken bearings on the axles, the number of loaded cars in a train can be considerably increased. Power costs are cut.

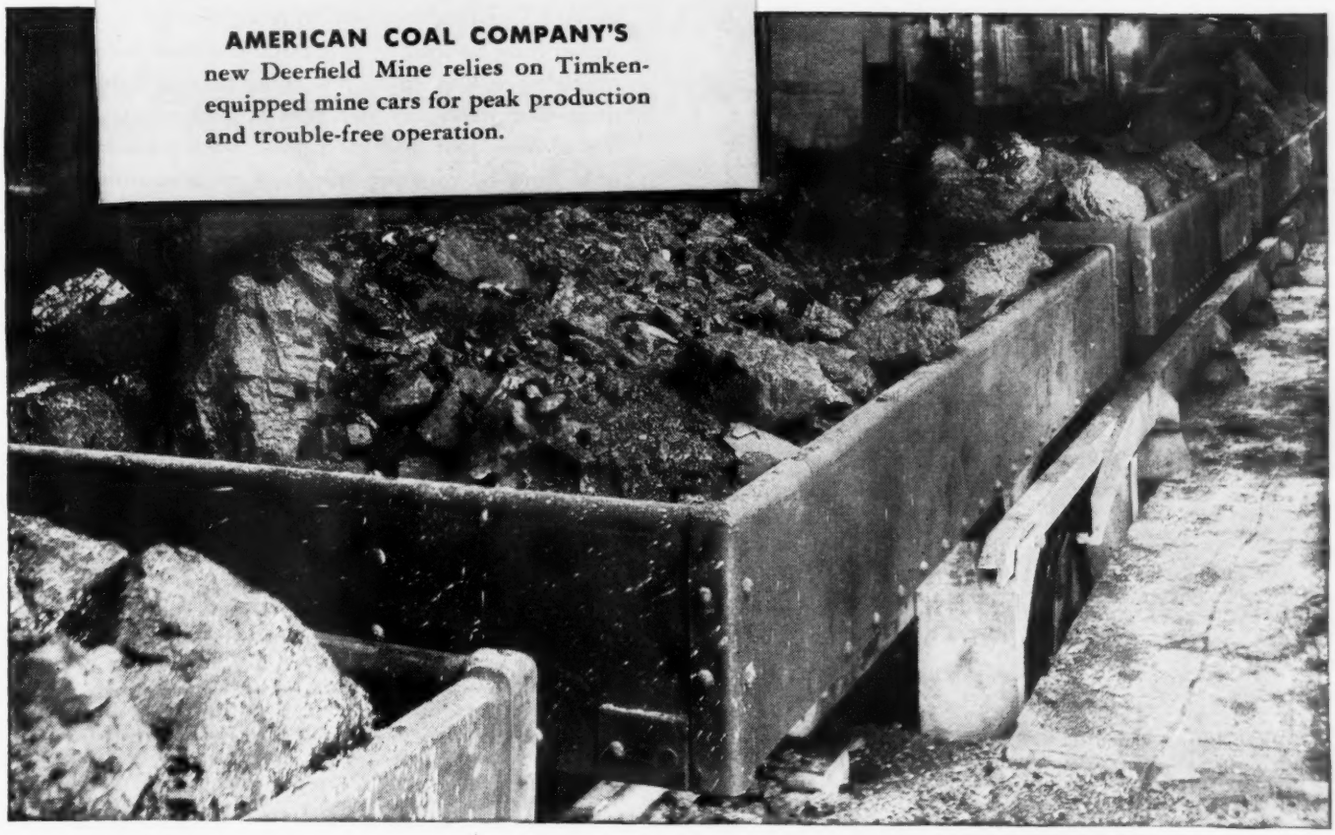
Tapered construction and line contact between rolls and races enables Timken bearings to take the heaviest radial and thrust loads in any combination. Lubricant is kept *in*, dirt, grit and moisture *out* because Timken bearings permit and maintain effective closures.

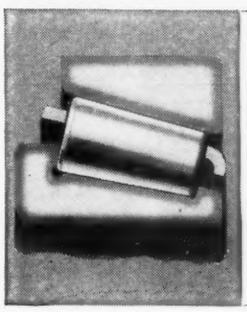
To insure peak production at minimum cost in *your* mine insist on Timken bearings in every new mine car you buy. And always look for the trade-mark "Timken" on the bearings you use. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED

This symbol on a product means its bearings are the best.

AMERICAN COAL COMPANY'S
new Deerfield Mine relies on Timken-equipped mine cars for peak production and trouble-free operation.



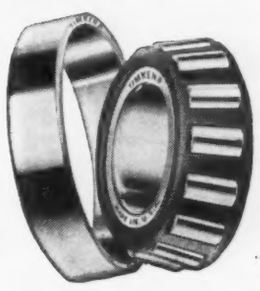


GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED
ROLLER BEARINGS

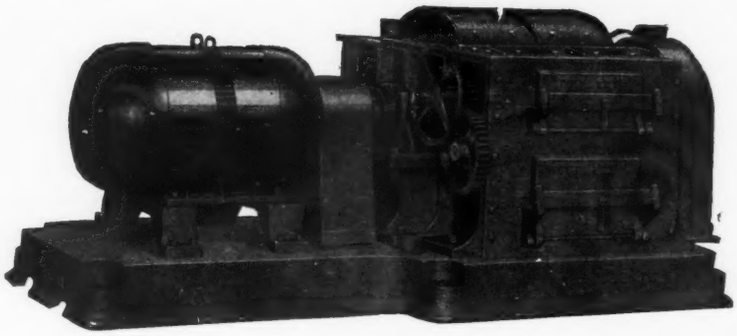


NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◎ AND THRUST —◎— LOADS OR ANY COMBINATION —✳

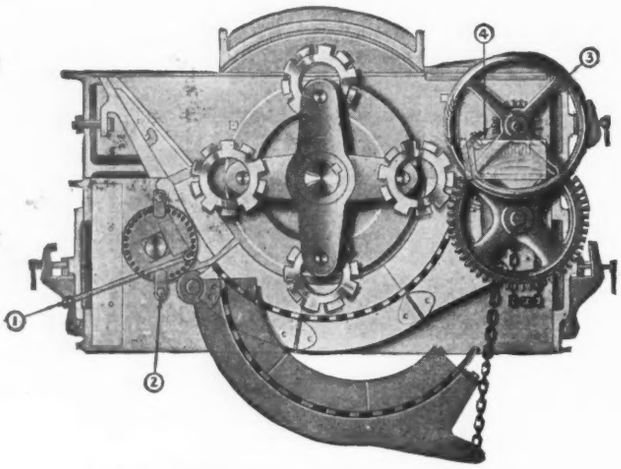
BY SPLITTING COAL INSTEAD OF CRUSHING IT

AMERICAN Rolling Ring CRUSHERS

Produce Uniform Marketable Sizes



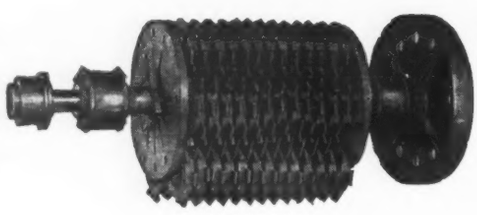
The American AC-Rolling Ring Type Crusher, shown direct—connected to motor and mounted on base plate—for reduction of ROM and lump coal to commercial screenings and stoker sizes.



Cross section view shows double adjustment features. 1. Set bolt releases. 2. Eccentric for grinding plate adjustment. 3. Handwheel for raising or lowering cage, locked in position with—4—Position lock Pawl.

Only the Americans have the patented manganese Shredder Rings which reduce by cleavage rather than by shattering impact. The slow speed, revolving action splits the coal, prevents clogging, and produces a minimum of fines. By control of fines your product is more readily marketable, and by reducing the load on preparation units, a high tonnage output is obtainable.

Precise engineering design, heavy duty construction, and efficiency features enable Americans to work continuously every day—it is not unusual to crush several hundred thousand tons with one set of parts. Adjustable grinding plate, and adjustable drop cage, permits the operator to obtain any size product within crusher range. Capacities to fit your operation, from 50 to 500 tons per hour.



Rotor assembly, showing simple construction, compact design, and the great number of cutting edges in the many rows of rings—also the overlapping of rings to cover the entire grinding chamber. Rings are mounted on individual shafts, and are free to deflect undamaged from tramp metal. The need for shear pins or other safety devices is thereby eliminated.

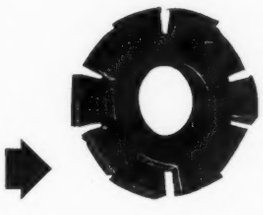


Photo showing construction of Shredder Ring, with 20 actual cutting edges or teeth.

Write for latest AC bulletin . . .

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE., ST. LOUIS 10, MO.

Dipper teeth, hard-surfaced with Hartop, last longer.

Service life of crusher parts increased with Hartop.

P&H

"HARTOP"

. . hard-surfacing electrodes increase equipment service life

...prove this to yourself — take advantage of our special low-price trial offer.

The Hartop series consists of 4 types of electrodes:

Hartop Brown for angular shock and abrasion has a Rockwell C hardness of 35-40.

Hartop Green for general all-purpose hard surfacing, a Rockwell C hardness of 45-50.

Hartop Red for resistance to severe impact and extreme abrasion, a Rockwell C hardness of 50-55.

Hartop Yellow for resistance to deformation caused by weight and impact, a Rockwell C hardness of 58-63.

Special Trial Offer

We have packed a special assortment of all 4 types of Hartop electrodes in a handy, moisture-proof, reusable tube. We offer this trial tube to you for the low price of $4.25 *postpaid.*

Our reasons for making this special offer are twofold: First, these electrodes save money, by helping you avoid costly tie-ups and by prolonging equipment life. Secondly, the ease with which Hartop electrodes can be applied must be seen to be appreciated.

We want you to discover these two money-saving advantages of Hartop. You will want to standardize on these long-wearing electrodes for all your hard-surfacing work. Take this simple step towards reduced maintenance and repair costs — mail the coupon today.

P&H WELDING ELECTRODES
4540 WEST NATIONAL AVENUE
MILWAUKEE 14, WISCONSIN
HARNISCHFEGER CORPORATION

AC Welders · Welding Positioners
DC Welders · Welding Production Control Systems · Electric Hoists

Special Low-price Trial Offer

HARNISCHFEGER CORPORATION
Welding Division
4540 W. National Ave., Milwaukee 14, Wis.

Gentlemen:

☐ Please rush my trial tube of new money-saving P&H Hartop Electrodes.
☐ Check or money order for $4.25 enclosed.
☐ Send C. O. D.
☐ Send me literature on the Hartop electrodes.

Name.....

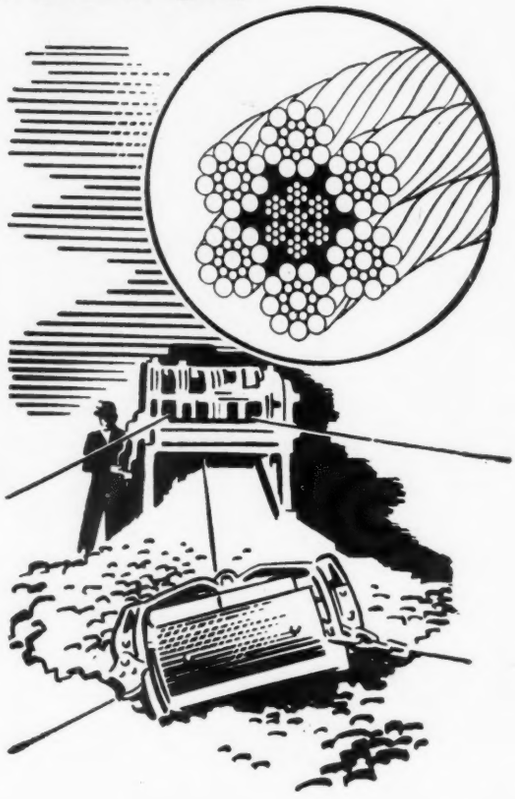
Address.....

City..... Zone.....

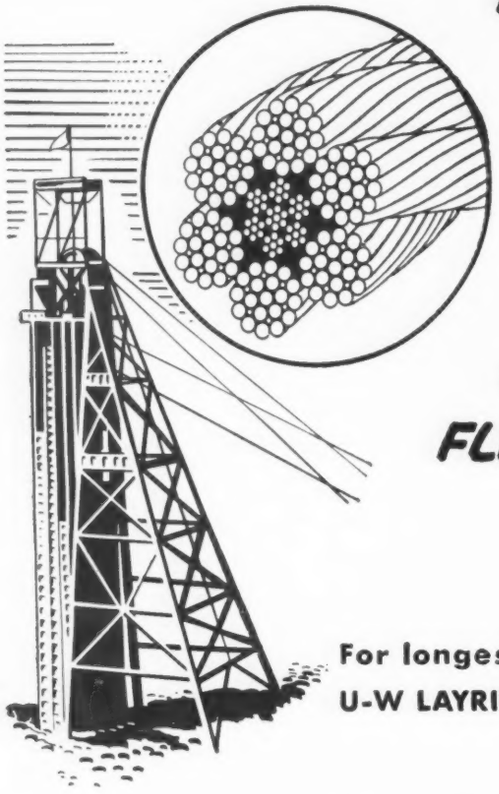
State.....

SOME ROPES FOOL YOU

U-W 6×19 SEALE IS AN EXCELLENT CONSTRUCTION FOR SLUSHER OR SCRAPER PULL ROPES BECAUSE IT HAS VERY COARSE OUTER WIRES TO RESIST ABRASION



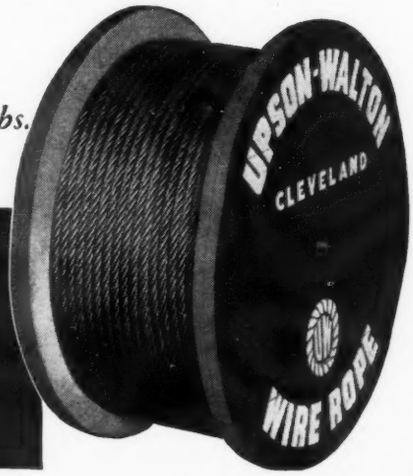
BUT...



FOR MINE SHAFT ROPES U-W 6×19 FILLER WIRE IS BETTER BECAUSE IT IS MORE FLEXIBLE AND RESISTS FATIGUE EXCEPTIONALLY WELL.

For longest and best service, always specify U-W LAYRITE (*Preformed*) IMPROVED PLOW STEEL

We invite you to let UPSON-WALTON engineer your tough rope jobs.



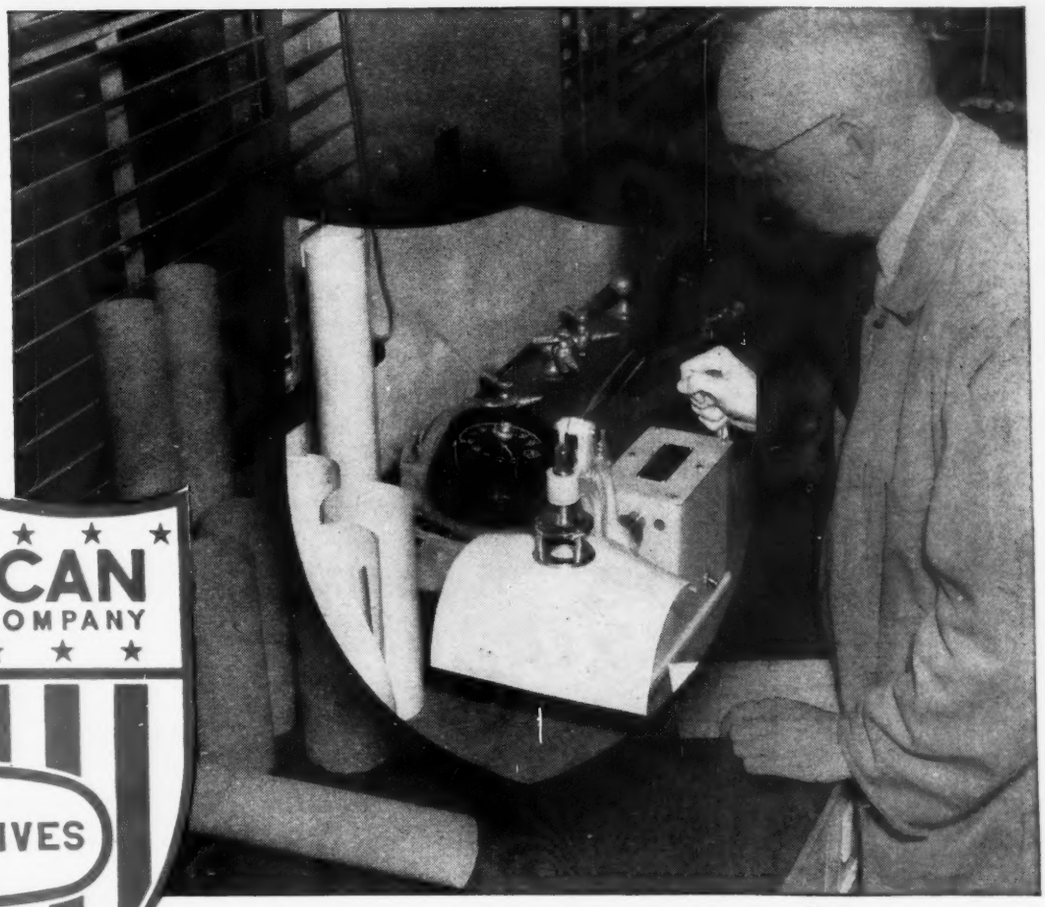
Copyright 1948 – The Upson-Walton Company

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

Main Offices and Factory: Cleveland 13, Ohio

114 Broad Street, New York 4 | 737 W. Van Buren Street, Chicago 7 | 241 Oliver Building, Pittsburgh 22



AMERICAN
CYANAMID COMPANY
EXPLOSIVES

BETTER *BREAKAGE* FOR YOUR COAL STARTS IN AMERICAN LABS...

Your primary interest in explosives is getting the *best possible* breakage of your coal veins. And that is exactly what AMERICAN Explosives offer you—through intensive research, close chemical control, painstaking care in manufacture and inspection.

AMERICAN research is vitally interested in *every detail* that affects the quality of explosives. Take paper, for instance. Because the cartridge wrapper is a part of the explosives, it receives the same exacting physical and chemical attention that is given every other ingredient that goes into AMERICAN blasting materials.

There is an AMERICAN explosive for all your blasting requirements—available for quick delivery from well-located plants and distributing magazines. For dependability, safety, speed and over-all economy, always specify AMERICAN.

Capable field engineers are available at your call

★ HIGH EXPLOSIVES ★ PERMISSIBLES ★ BLASTING POWDER ★ BLASTING ACCESSORIES

AMERICAN CYANAMID COMPANY

EXPLOSIVES DEPARTMENT

30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

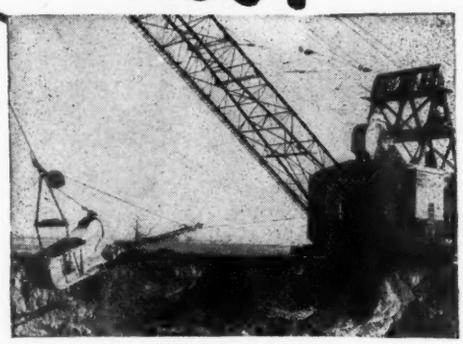
SALES OFFICES: PITTSBURGH, PA. • BLUEFIELD, W. VA. • SCRANTON, PA. • CHICAGO, ILL. • POTTSVILLE, PA. • MAYNARD, MASS.

WORLD'S LARGEST DRAGLINE BUCKET

Rated at 30 cu. yds. this new Page AUTOMATIC is actually handling 34 to 35 cu. yds. of overburden per pass cycle time of one minute to one minute and fifteen seconds. Loading time is 6 seconds — dumping time 3 seconds which is good performance for many types of much smaller buckets and peak efficiency for any type of larger dragline buckets.

Whether your requirements are for a 3/8 yd. bucket or 30 yards, a Page AUTOMATIC will move more dirt in less time than any other bucket made. It digs in immediately and gets a full load within one or two bucket lengths. There's little or no spillage with each full load. Page AUTOMATICS are built no heavier than your specific job requires but have all the necessary weight for good digging, sturdiness and minimum maintenance. The new booklet, "How to Get the Most Out of Your Page Automatic Dragline Bucket" will give you complete details. Send for your copy today.

a Page Automatic of Course!

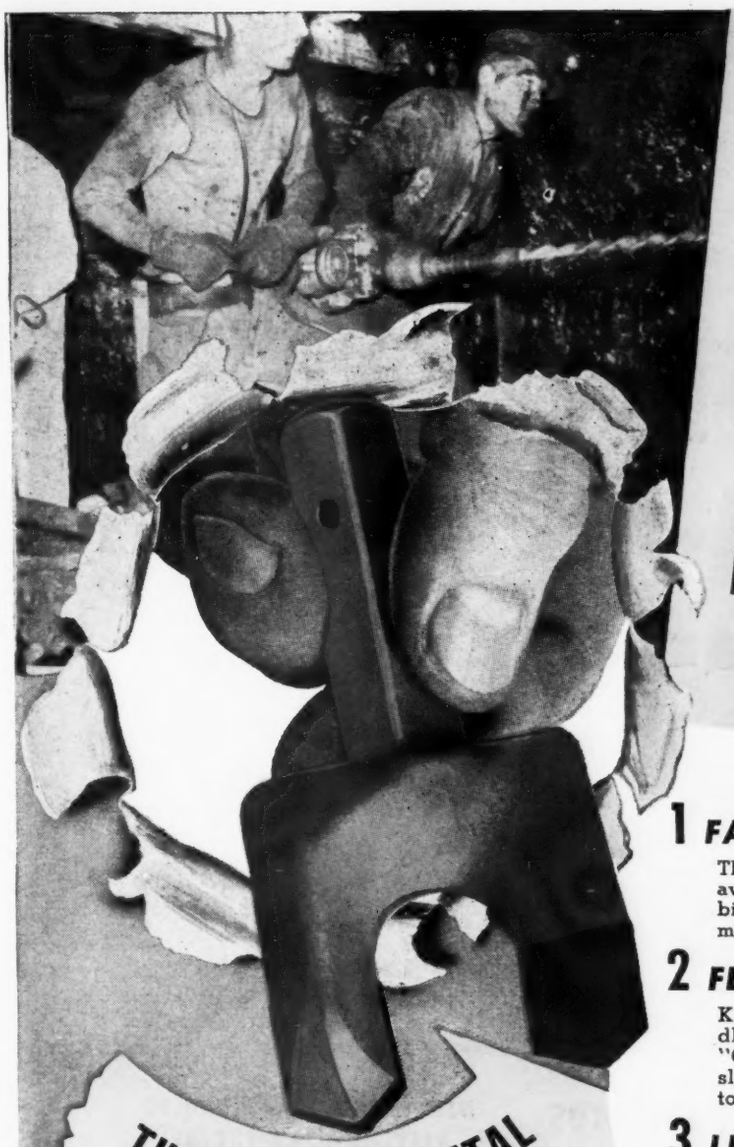


Northern Illinois Coal Corporation gets full loads every time with the world's largest dragline bucket stripping overburden at depths ranging from 30 to 70 feet.

PAGE ENGINEERING COMPANY
Clearing Post Office
Chicago 38, Illinois

PAGE *Automatic*

DRAGLINE BUCKETS *and* WALKING DRAGLINES



5 WAYS to Cut Your Drilling Costs *with* KENNAMETAL Drill Bits

THE HARDEST METAL USED IN MINING

How much do the drill bits you use actually cost when you figure bit life, footage drilled, drilling speed, labor cost, and maintenance on the drilling machine? When all these factors are considered a bit that costs a few cents more at first can save hundreds of dollars in the end. For factual performance data on Kennametal Drill Bits write Mining Division, Kennametal Inc., Latrobe, Pa.

1 FASTER DRILLING

The speed of drilling with a Kennametal bit is, on an average, 50% faster than that with any other type of bit. Tough, hard Kennametal tips cut freely; stay sharp much longer.

2 FEWER BIT CHANGES

Kennametal bits last longer; reduce labor costs of handling and changing. Example: Penna. mine reports—"One Kennametal Bit drilled 2700 feet of coal and slate before dulling . . . 300 steel bits were required to do the same job."

3 LESS POWER CONSUMPTION

Kennametal Bits drill accurate single-gage holes. It takes approximately half as much work to drill in single gage . . . and substantially less power. Example: Pittsburgh seam—"Machine driven 2¼" Kennametal Bit requires 40% less power than steel bits."

4 LOWER BIT COSTS

Mason County, W. Va. mine reports—"We formerly used up 160 steel bits during two shifts. Now one Kennametal Bit lasts as long." This is typical—many mines report bit cost reductions of as much as 50% *before Kennametal bits become dull.* And they can be resharpened many times before they are worn out.

5 REDUCED MAINTENANCE

Dull bits throw an excessive load on the drill; cause armature failure. Kennametal Bits hold their edge far longer; permit easier cutting at uniform drilling speed; avoid overloading of drill; sharply reduce repair costs. Example: Green County, Pa. mine—"Armature failures averaged 6 to 10 per week before using Kennametal Bits; are now less than one a week."

Is Kennametal Harder Than Steel?

Kennametal is much harder than steel. Its Rockwell C hardness is up to 80.6 against a maximum of 65-66 for the hardest steel. And it must be remembered that differences of even a few points in the upper end of the Rockwell scale are more important than the numerical value indicates. Kennametal's extreme hardness, plus its high compressive strength (up to 800,000 PSI) are the essential factors in its ability to resist abrasion and wear for extended periods of cutting.

KENNAMETAL

THE WORLD'S LARGEST MANUFACTURER OF CEMENTED CARBIDE MINING TOOLS

CHEVROLET

NEW CHEVROLET ADVANCE-DESIGN '48 TRUCKS ARE LOWEST IN PRICE!

and have *all* these new and finer features

Here are the *newest* trucks—the *latest* and the *greatest* features—the *biggest* values—with the *lowest prices* in the volume field! Model for model, and with comparable equipment and specifications, Chevrolet Trucks *list for less* than competitive makes—some models *as much as $150!* Here is Advance-Design that provides the cab that "breathes,"* Flexi-Mounted Cab, Uniweld all-steel cab construction, fully adjustable seat, all-round visibility with rear-corner windows,* extra-durable frames, specially designed brakes, and many other features that put Chevrolet trucks far ahead of the field. See them at your Chevrolet dealer's.

CHEVROLET MOTOR DIVISION, GENERAL MOTORS CORPORATION
DETROIT 2, MICHIGAN

*Fresh air heating and ventilating system and rear corner windows optional at extra cost.

NEW CHEVROLET 4-SPEED SYNCHRO-MESH TRUCK TRANSMISSION

This Chevrolet-developed Synchro-Mesh transmission in heavy-duty models provides new ease and efficiency.

NEW CHEVROLET ADVANCE-DESIGN GEARSHIFT CONTROL

Steering-column gear shift (on models having 3-speed transmission) gives new freedom to the driver, leaves cab floor unobstructed.

NEW FOOT-OPERATED PARKING BRAKE

Chevrolet's foot-operated parking brake (on models with 3-speed transmission) provides new clear floor area.

NEW IMPROVED CHEVROLET VALVE-IN-HEAD ENGINE

The world's most economical engine for its size. Has greater durability and operating efficiency.

NEW MULTIPLE-FEATURE DEVELOPMENTS

New splined rear-axle shaft attachment to wheel hubs in heavy-duty models.... Heavier springs . . . New propeller shaft bearing-support and seal design.

Team up two Oliver "Cletrac" crawler tractors with a bulldozer and front-end loader and you've got a winning combination that really pays off in fast, low-cost dirt moving.

With the exclusive Oliver "Cletrac" steering principle, the tractor-dozer unit cuts your clearing time to the minimum. There's always power on both tracks for biggest load-handling ability. You can speed up one track, slow down the other to offset the side pull of an off-center load. Time-wasting, power-wasting jackknifing is eliminated. And with constant two-track power, operation on hills and slopes is safer.

Oliver "Cletrac" steering lightens the load of front-end loaders, too. There is no undue strain of tractor frames or steering mechanisms. This Oliver "Cletrac" loader is a fast-acting unit that really makes dirt fly! Controlled "tip-up" bucket prevents spillage of loose material. And, since there's no excess weight on the front of the tractor, lifting capacity is materially increased.

Why not have your Oliver "Cletrac" dealer show you how this hard-working "team" can speed your jobs?

"THE SIGN OF EXTRA SERVICE"

OLIVER Cletrac SALES SERVICE

Cletrac

a product of

The OLIVER Corporation

INDUSTRIAL DIVISION: 19300 EUCLID AVENUE, CLEVELAND 17, OHIO

When rock bars your way to tonnage

Gardner-Denver S33 Sinker

When rock bars your way . . . when you need a fast, light, powerful drill . . . you'll find the Gardner-Denver S33 Sinker a handy aid to increased coal tonnage. Weighing only 31 pounds, this drill is light enough for work in hard-to-reach spots—yet has the speed and power to establish performance records. An easy riding drill with exceptional hole cleaning ability, the S33 is ruggedly built for tough service. No wonder it is known as the champion in its weight class.

Other features you'll like:

- *Extremely short valve stroke permits unrestricted admission of air. Large bearing areas on valve plug minimize wear.*
- *Large oil reservoir surrounds cylinder bushing; feeds oil automatically to all working parts.*
- *Large size bearing on both sides of rifle bar head insures proper alignment.*
- *Blower valve and handle forged in one piece.*
- *Steel puller easily disengaged by hand—yet cannot open accidentally.*

GARDNER-DENVER

SINCE 1859

For complete information, write:
Gardner-Denver Company
Quincy, Illinois

Firestone
EARTH MOVER TIRES

FIRESTONE builds off-the-highway tires for every road, load and condition of service. For big, free-rolling scrapers, tractor and trailer wagons and buggies, that tire is the Firestone Earth Mover.

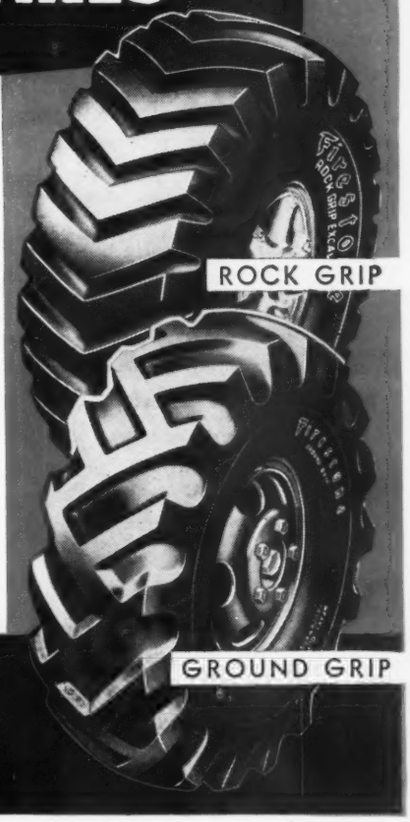
It provides maximum flotation and minimum rolling resistance. Its extra strength rayon cord body and its extra tough cut-resistant tread are built to stand up on the job . . . to stay on the job. This means more yardage, less downtime . . . more profit.

If you want the greatest possible traction for the drive wheels of your earth moving units, use the Firestone Ground Grip Tire. For stamina and extra traction in quarrying, logging, strip mining . . . use the Rock Grip.

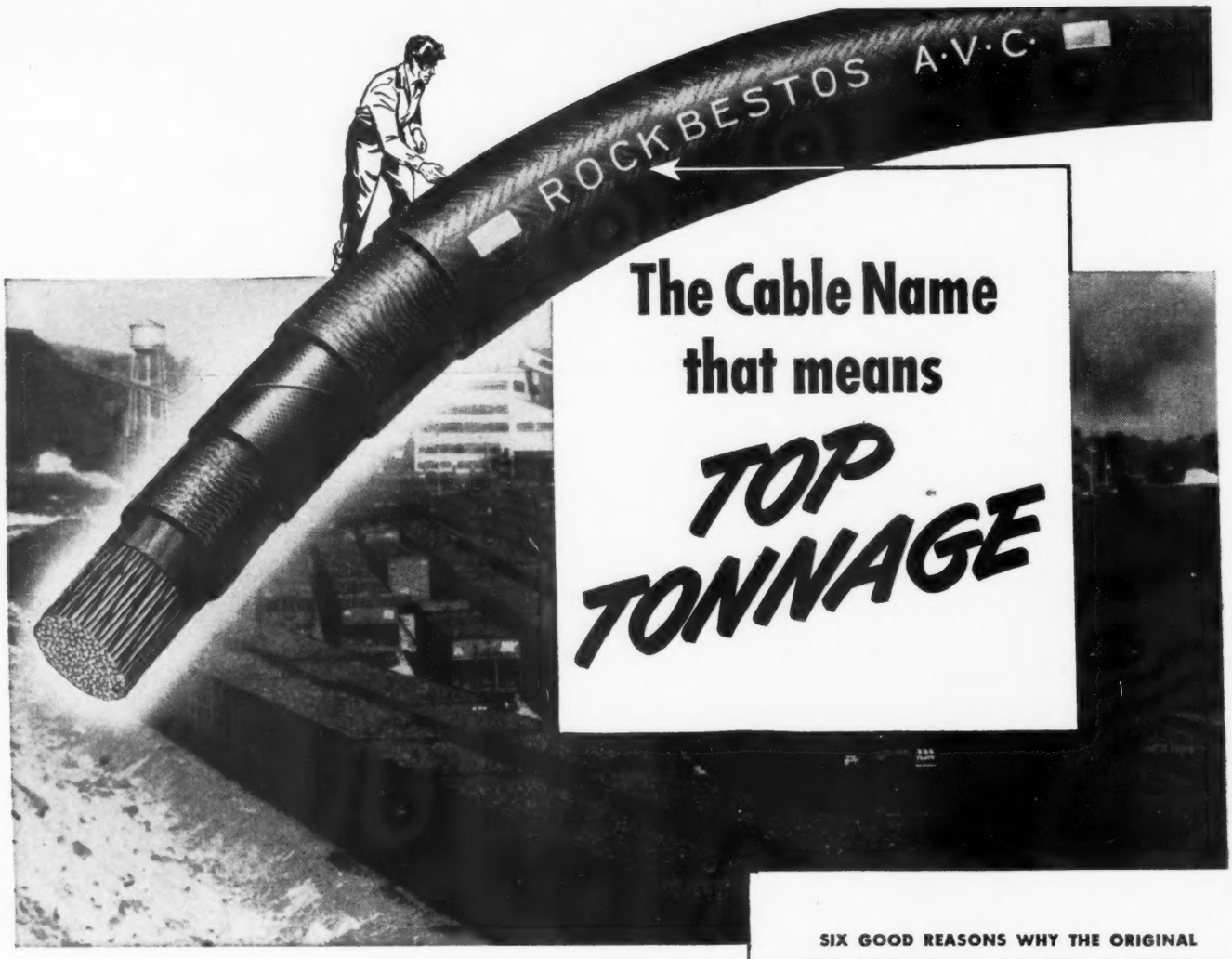
Proven cost-cutters on every job.

Listen to the Voice of Firestone every Monday evening over NBC

Copyright, 1948, The Firestone Tire & Rubber Co.



Firestone OFF-THE-HIGHWAY TIRES



For every piece of equipment you use in taking out coal, here's the cable that keeps it *on the job* no matter how tough the operating conditions are. Locomotives, drilling machines, cutters and loaders push tonnage UP and maintenance expense DOWN—*when Rockbestos A.V.C. goes in.*

Permanent insulation is the answer. It gives you a cable that won't dry out or crack under heat . . . a cable that won't bloom or rot when exposed to oil or grease. And because this insulation and the asbestos braid are fire-resistant, you *know* that Rockbestos A.V.C. cannot ignite, burn or carry flame.

Start now to reduce maintenance expense and take out more tonnage by specifying Rockbestos A.V.C. in new and rebuilt equipment. When heat-baked internal wiring fails, be sure it's replaced with "*The Cable With Permanent Insulation.*"

Write for a cut-back sample and we'll send along your copy of Bulletin 30-C containing complete specifications.

ROCKBESTOS PRODUCTS CORP., Dept. M-11, Box 1102, New Haven 4, Conn.

SIX GOOD REASONS WHY THE ORIGINAL ROCKBESTOS A.V.C. STANDS OUT AND STANDS UP

- The impregnated asbestos yarn braid is heat-proof, flameproof and resistant to moisture, oil, grease and alkalies.
- The felted asbestos insulation beneath, impregnated with heat, flame and moisture resisting compounds like the braid, won't bake out, crack, flow or burn.
- Asbestos-protected varnished cambric supplies high dielectric strength and added moisture resistance.
- The inner impregnated asbestos insulating wall won't get brittle or crack under conductor-heating overloads and won't burn even if the copper melts.
- The paper separator prevents the insulation from sticking to the conductor and makes stripping easy.
- It is made to fit bushings properly.

This construction is one of 125 developed by Rockbestos for severe operating conditions.

ROCKBESTOS A.V.C. — The Cable with Permanent Insulation

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."

BECKLEY, W. VA.:	National Mine Service Co.	EVANSVILLE, IND.:	Evansville Elec. & Mfg. Co.	PITTSBURGH, PA.:	Upson-Walton Co.
BIRMINGHAM, ALA.:	Moore-Handley Hdwe. Co.	FAIRMONT, W. VA.:	Fairmont Supply Co.		Westinghouse Elec. Supply Co.
BLUEFIELD, W. VA.:	Superior-Sterling Co.	HUNTINGTON, W. VA.:	Banks-Miller Supply Co.	SCRANTON, PA.:	Penn. Elec. Engineering Co.
CHARLESTON, W.VA.:	Charleston Elec. Supply Co.	LOTHAIR, KY.:	Mine Service Co.	WHEELING, W. VA.:	Westinghouse Elec. Supply Co.
CLEVELAND, OHIO:	Upson-Walton Co.	MIDDLESBORO, KY.:	Rogan & Rogan Co.	WILLIAMSON, W.VA.:	Williamson Supply Co.

YOU CAN SEE

why . . . Maintenance is less

when . . . Inspection's no guess

It's rhyme *and* reason, for a locomotive is given proper inspection and maintenance only if it can be done with minimum effort. Westinghouse Mine Locomotives have *all* of the features to meet this requirement.

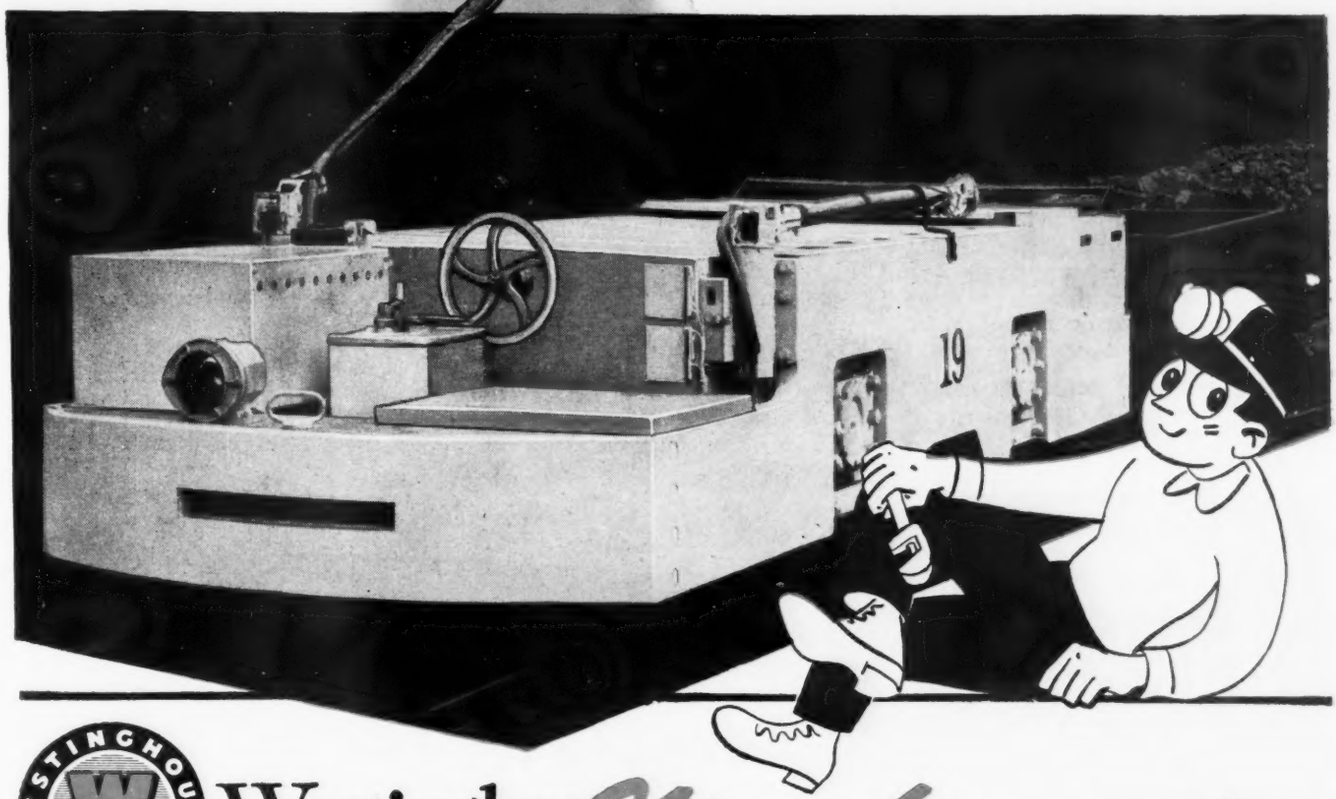
The reason is simple. Westinghouse not only provides the best mechanical and electrical details . . . but assembles them to permit *maximum accessibility*.

Here are a few examples of how this 15-ton mine locomotive meets these requirements:

- **FLUSH SIDE FRAME** gives several extra cubic feet of equipment space.
- **UNIT SWITCHES** are mounted across the front end of the locomotive for simple inspection.
- **MAIN RESISTOR** is mounted in one frame . . . eliminating unnecessary wiring and connections.
- **WIRING** is laid in metal troughs for increased accessibility and protection.
- **JOURNAL BEARINGS** are adjusted by merely turning an accessible lid.
- **BRAKE SPREADER** is easily adjusted. The locomotive side frames are cut away at the point of adjustment to permit ease of accessibility.

For further proof call your nearest Westinghouse office, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-15128



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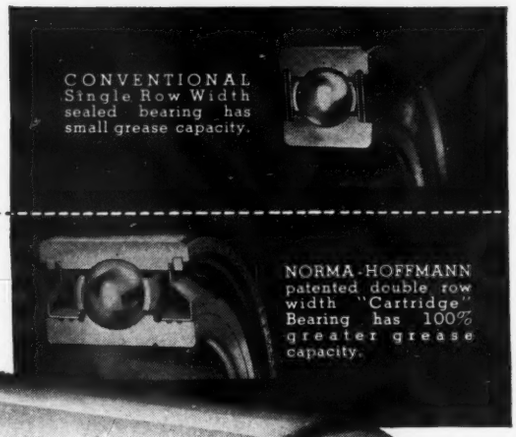

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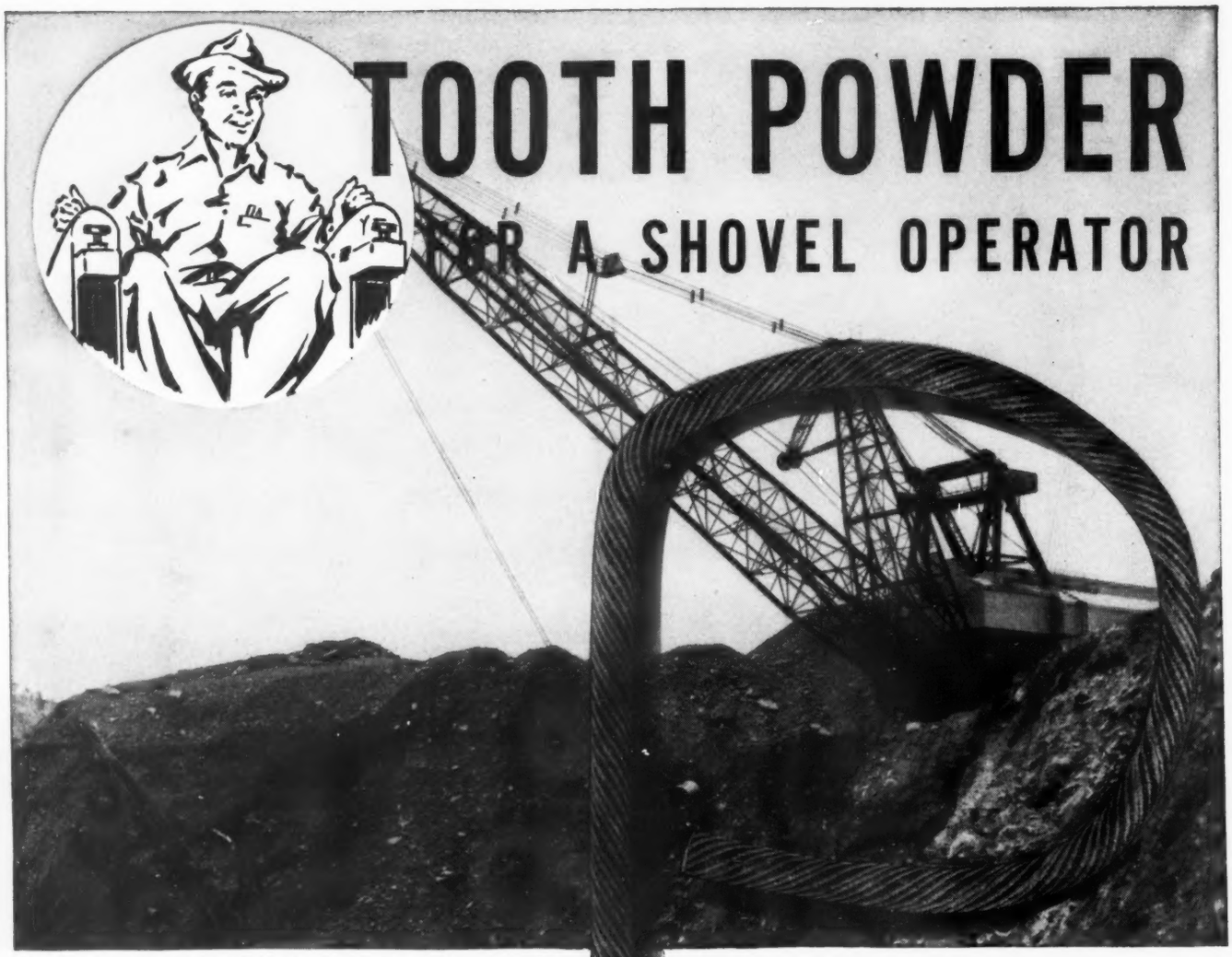

TOOTH POWDER FOR A SHOVEL OPERATOR

Photograph courtesy The Philadelphia and Reading Coal and Iron Co.

FROM SHOTS FIRED WITH RIMACORD

Every time a shot is fired with Primacord, fragmentation reaches a point where drag-line or shovel teeth get easy digging . . . operators can load more trucks per hour . . . yardage goes *up* — costs stay *down*.

You get this efficiency because Primacord — and only Primacord — is itself a detonating agent. In every hole, Primacord is in direct contact with the individual cartridges and detonates them with full power. In every hook-up you can plan so that front holes shoot a split-second before succeeding holes. This combination of *full power* and *relief of burden* boosts fragmentation to give your operators *faster going*.

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

APRIL, 1948

IVAN A. GIVEN, EDITOR

Opportunities Plus

FOR THOSE who like an opportunity to spread their wings and try new things, there is nothing like coal mining. Today, there is the challenge to thinking and originality offered by the need for cutting costs, improving product quality, promoting safety and creating better relations with employees and the public. Today and tomorrow there are the opportunities inherent in a future that looks steadily brighter and the satisfaction to be derived from creating the additional producing capacity that all signs now indicate will be necessary to meet increasing demands.

Coal is now on the threshold of the new era that the continuous mining and loading machine will bring about. But even without that, saving money and promoting safety and efficiency through getting more out of present equipment and by adopting new constructions, new materials and new techniques provides the mining man plenty to exercise his brain cells on. An example is a new low-cost portal construction featuring, among other things, glazed tile walls and special floor surfacing that will save thousands of dollars a year in cleaning, painting and maintenance. Another is underground entries with dams for low-cost convenient sludge disposal that really clarifies the water. Still another is construction of special rock-dust storage containers and carriers from used oil drums. They are more convenient and protect the dust supply for fire-fighting and other purposes. Then there are the new stripping techniques, which include adjustment of shooting to throw much of the overburden over the hill and reduce casting, as well as handling methods which leave the spoil leveled to legal standards without further work. Many other new ideas could be cited to indicate the opportunities now available in coal mining. The men who take advantage of them are building better futures for themselves as well as for the industry.

Individuals Too

AT THE MOMENT, coal is probably in the best position in years to make hay with the public. But the tide has barely turned and setbacks still could be experienced. It is no time, in short, to take things easy. Rather, it is time to put on the pressure. In this, the individual is just as important as the national or regional association, since public opinion is a composite of the thinking of the individuals making up that public. The neighbor of the coal man is as important as the citizen of a far-off metropolis—perhaps even more so. The coal man therefore should be conducting his own public-relations program, talking to his neighbors and to local community groups at every possible opportunity. Not only does it mean a better future for the industry, but his own organization benefits through better business and better relations with the community.

Well Done

DAN HARRINGTON, chief of the health and safety branch of the U. S. Bureau of Mines, retires this month, ending nearly half a century of working in furthering mine safety. His shoes will be hard to fill. Many men—with federal and state agencies, the operators and among the miners—have worked long and zealously to promote mining safety, but few, if any, can match his single-minded devotion to this most worthwhile of all causes. Nobody knows exactly how many lives Dan's efforts have saved and how much suffering he has prevented but the total is no small one. The work will go on, but in stepping out of active participation, Dan Harrington takes with him a hearty "Well done!" from all men in the mining industry.

Photograph by Pittsburgh Sun-Telegram from International News Photos

UNWILLING AND UNABLE, these miners support Lewis in his exercise of the monopoly power granted him by federal legislation and administrative partiality—power that has been hardly dented by the Taft-Hartley Act.

Pensions or Power?

Labor-Leader Monopoly Power Rooted in Federal Legislation and Policy the Real Issue in the Pension Strike—Fundamental Remedies the Promotion of Employer-Employee Teamwork and Public Understanding

ONCE AGAIN, in the pension strike, is pointed up the real meaning of the monopoly power held by labor leaders as a result of federal intervention in the field of employer-employee relations—on the side of said labor leaders. The ostensible issue in the pension strike was the demand for an immediate pension of $100 per month for miners reaching 60 with 20 years of service in the industry—in spite of the contract provision that any such payments out of the health and welfare fund should be on an actuarial basis. The real issue however was how far a labor leader can carry monopoly power and through such power force settlements of issues on his own terms.

Because Lewis is Lewis, the coal industry—and through it the country—has felt to the nth degree the effects of the exercise of monopoly power ceded to labor leaders in the Wagner Act. Because coal is the major source of fuel and energy, and consequently is very much a key industry, Lewis is in a peculiarly favorable position when it comes to putting on the economic screws, this despite subsequent legislation aimed at curing some of the Wagner Act's most obvious defects.

It was federal legislation that put Lewis back in business in 1933, when he was able to organize the industry practically without opposition under the recognition and collective bargaining provisions of the National Industrial Recovery Act. Expanded and strengthened, these provisions were the core of the National Labor Relations Act, otherwise known as the Wagner Act, which declared it to be federal policy to encourage and promote organization of employees and bargaining through representatives of their own choosing. The Act made it an unfair practice for employers to refuse to deal with labor organizations and their representatives. In other words, the employer had —and has—no choice. He is required to deal with labor leaders.

The Taft-Hartley Act, it is true, was passed over a Presidential veto, with the idea that it would place some of the burden for achieving labor peace on the labor leader. While it sets up some restrictions, that Act, however, left practically undisturbed the Wagner-Act requirement that employers deal with labor leaders on demand. In addition, the Taft-Hartley Act approves practically everything, except a strictly closed shop, arrived at by "collective bargaining."

As long, therefore, as the Wagner Act is on the statute books, supplementary and amendatory legislation can have little except palliative effect as long as labor leaders choose to take advantage of the power placed in their hands—and there are few, if any, that show any signs of abstaining. For example,

Press Association

JOHN L. LEWIS. His hints are law to the coal miners under existing federal labor policy. With coal a key industry, his bargaining position is extremely favorable.

the Taft-Hartley Act apparently permits "contracts" that are not really contracts. A "contract" with, for example, an "able and willing" clause in it is not a real contract because it leaves one party bound and the other free.

Because of the "able and willing" provision and other escape clauses, the 1947 "contract," while it has the outward appearance of a real agreement, was nothing more than a statement by Lewis of the conditions under which he would permit the miners to work—when and if it suited his convenience to have them work. Because it looked something like a contract and was the only way out of a real dilemma, it was not challenged. In contrast, the balder attempt of the International Typographical Union to do the same thing (impose their own conditions without consulting the employers or anybody else) brought the NLRB general counsel down on them with an injunction application, presumably because union officials were not going through the motions of trying to get employer signatures on the document.

Supplementary and amendatory legislation that does not go to the root of the difficulty, i. e., the Wagner Act provisions previously summarized, accomplishes little and, in addition, actually may enhance the difficulties already being experienced. This is evidenced by developments since the passage of the Taft-Hartley Act. One is the attempted action of the International Typographical Union.

Closer home, the 1947 coal contract with its specific citation of purported compliance is evidence that the Taft-Hartley Act was a consideration in its framing. In fact, union officials made no secret of the fact that they were after a document that would leave them free of any possible penalty. Thus, developed the "able and willing" clause and other provisions, which in effect made the contract not an agreement in reality but a statement of the terms and conditions governing work by the miners as long as they or their officials chose to let work go on.

Further Action Needed

It is fair to assume that results such as these were not what the framers of the Taft-Hartley Act and those who voted for it in Congress had in mind. They illustrate, however, the difficulties of trying to affect natural economic forces by legislation or fiat action. The reaction always is to try to find a way to bypass the obstruction, with the result that the situation may be made worse rather than better.

The preceding is not to imply that the Taft-Hartley Act is not a step forward. Its passage was an excellent thing in that it signaled recognition of the need for doing something to rectify the original mistake. The Act was a groundbreaker and its passage in the face of bitter opposition by labor leaders and their administration backers should make it easier to take the necessary additional steps that events have proved should be taken.

Whether the ultimate will be an outright repeal of the Wagner Act and other federal labor legislation, and the departure of the federal government from the field of employer-employee relations, is a question no one can answer at the moment. Whether such a drastic reversal is desirable, in view of the economic power involved, is another big question. Whether enlightened labor leadership, no less than enlightened management, can jointly achieve relations that will eliminate any possible need for legislation is still another. Present federal legislation—and its companion state statutes—certainly is not, in the light of events over the years, the answer.

One of the major hazards in one-sided concentrations of power is the difficulties involved in reaching the fairest possible decisions on issues, taking into account public as well as employer and employee interests. The 1947 contract is a case in point. Lewis made a clean sweep because he had the power, despite the existence of the Taft-Hartley Act. Facing the fact that holding out for real consideration of their views would prolong the stoppage, deal the economy a real blow and subject the industry to further government intervention and possibly seizure, the operators had no choice but to accede to contract provisions setting the stage for additional controversy in the future—as has come to pass.

Aside from "able and willing" and other loopholes for the union and its officials, the contract provided that money could be appropriated from the health-and-welfare fund for the payment of pensions, the pertinent provision reading as follows:

"The aforesaid trustees shall designate a portion (which may be changed from time to time) of the payments herein provided, based upon proper actuarial computations, as a separate fund to be administered by the said trustees herein described and to be used for providing for pensions or annuities for the members of the United Mine Workers of America or their families or dependents and such other persons as may be properly included as beneficiaries thereunder.

"It is further agreed that the detailed basis upon which payments

ROADS TO LABOR PEACE

1. Radical revision of federal labor policy and legislation to curb union-leader monopoly power—a job for Congress, industry, workers and the public.

2. Getting the facts to the public to promote understanding and generate a demand for fairness in the governmental and union-leader approach to employer-employee relations—a job for individual employers as well as industry in general.

3. Achieving real employer-employee teamwork by promoting understanding through facts, supplementing fair treatment, good wages and good working conditions—likewise a job for individual employers as well as industry in general.

from the fund will be made shall be resolved in writing by the aforesaid trustees at their initial meeting, or at the earliest practicable date that may by them thereafter be agreed upon."

The contract also provided that of the three trustees one should represent the union, one the operators and the third should be neutral. It provided further that in case of a deadlock over appointment of the neutral trustee an impartial umpire should be selected by agreement or by petition by either party to the U. S. District Court for the District of Columbia for the appointment of such impartial umpire.

The contract further provided that disputes of a national character should be resolved "by the full use of free collective bargaining as heretofore known and practiced in the industry."

The health and welfare fund was not activated at the first meeting of the trustees but, under the terms of the contract, it could be done at a later date, statements by Lewis to the contrary notwithstanding.

Payments into the special fund for pensions were to be *based upon proper actuarial computations* and there is no evidence to indicate the Lewis demand was based on any such computations. In fact, there is evidence that he ignored two preliminary studies. The fact that Lewis was determined to call the tune is inherent in the resignation of Thomas E. Murray, the neutral trustee. As Lewis put it in his letter of March 12 to his union membership, which letter precipitated the latest strike, "Thomas Murray, of New York, who was a third trustee of this fund, has resigned rather than side with the mine workers." Finally, Lewis made no attempt to avail himself of the right of petition for appointment of a new neutral trustee by the court or of the general clause providing free collective bargaining as a means of resolving national disputes.

Even if all these possible ways of reaching an agreement had not been available there is nowhere any evidence that the matter was so critical that it was necessary to resort to a work stoppage in a time of growing national crisis to reach an answer. Since pension payments were to be based upon proper actuarial computations, that alone would rule against a snap settlement. In addition, it would seem logical that patience and thorough study of all phases would be a necessity in a problem of the magnitude of pension payments for miners.

In short, in view of the nature of the problem and of the grave consequences of arbitrary action that might shut down the mines at this critical time, the best that could be expected was that haste should be made slowly. Instead, Lewis made his own determination of what the settlement should be, refused to avail himself of the means of resolving the issues provided in the contract and precipitated an industry-wide strike.

The Wagner Act had as its announced purpose the removal of burdens on interstate commerce by promoting peaceful employer-employee relations. But there has been little peace since its enactment. The conclusion is clear that the Act itself is responsible because it ceded monopoly power to labor leaders and made it easy for them to use it. As noted, subsequent legislation, including the Taft-Hartley Act, has changed the fundamental situation but little, while the administration still backs labor leaders wherever possible as a matter of policy.

How, therefore, can peace be attained, particularly in the coal industry? Fundamentally, as has been long pointed out, it is the achievement of complete teamwork between operator and miner, based on understanding of the real problem on both sides. When that teamwork is achieved, the need for labor unions and labor-union officials will disappear automatically, along with the need for legislation. Setting down the cure is quite a different thing, however, from putting it into effect. The goal will not be achieved overnight but the rewards are well worth the effort. In fact, if the effort is not made, continued application of monopoly power may result in changes in our fundamental principles that will leave everybody worse off. So, while complete teamwork will not appear tomorrow it can become a reality in the not-too-distant future. Action now will speed up the process.

True teamwork will be a product of progress on many fronts—governmental, employer, employee and public, to name but a few.

A logical first step is radical revision of the governmental approach to the problem of employer-employee relations. With the advent of the New Deal, that approach became partly one of legislation ceding power to labor leaders, coupled with implanting in the worker's mind the idea that his primary loyalty and duty was to the labor leader. How hard and how well that philosophy was sold is reflected in the way the miners follow Lewis' orders, and even hints. More of them are questioning the wisdom of what is taking place but, largely deprived of counter counsel and with the governmental example constantly in front of them, they continue to go along —for the present at least.

Legislation Must Be Revised

First, federal legislation creating and protecting labor-leader monopoly power should be revised or repealed, starting with the Wagner Act. An encouraging start has been made but Congress should carry through. Outright repeal of the Wagner Act may appear to many as too drastic an answer, although a calm appraisal of the results leaves little to be said in its favor. There is room for major improvement, and intensified study of the problem on a national rather than a vote-getting basis should yield real results.

Second, federal executive and administrative officials should be required to accord equality of treatment to all citizens, whether they be stockholders, employers or

workers. Partiality to labor leaders has been the rule since the New Deal came into office. It should be ended immediately and for all time.

Revision of the legislative and administrative approach would go far toward dispelling perhaps the No. 1 illusion of the years beginning with the New Deal: i. e., the assumption that employers can and should be expected to cope with monopoly power such as that held by Lewis. The fact is they cannot, especially when they also are opposed by the government. Consequently, recent years have been distinguished by settlements frankly offered not as decisions on merits but to get work resumed—in other words, settlement by appeasement. Senator Bridges was the latest to follow that well-worn path in his pension proposal and accompanying explanation April 12.

Union Regulation a Possibility

If Congress and the administration should choose to perpetuate the monopoly held by labor leaders, then the eventual answer will be further regulatory legislation. This follows from the fact that once a monopoly is established, there are only about two practicable ways of handling it: elimination of the basis for the monopoly, which automatically puts it out of business, or regulation.

If it proves impossible to stimulate legislative and governmental action in the direction of eliminating the basis for the monopoly, then about all that is left is for the government, which brought it into being, to take on the job of dealing with it. This would have the big advantage of putting the responsibility for the results where it ought to rest: squarely on the shoulders of the labor leader and the government. The possible disadvantage lies in the tendency of government to stretch an inch into an ell. Thus, in regulating the union monopoly, government might also elbow its way into regulating all the affairs of industry with the excuse that such regulation was necessary to enable it to deal effectively with union leadership. The seizures of the past are cases in point.

Congress is the key. The aim should be to elect members who will sincerely try to arrive at a fair and equitable solution. Once elected, they should be given every possible help in deciding on what is right and good for all parties concerned, including the consumer and the general public. Once federal policy is directed along the right road, state and local authorities will follow along, since they take their cue from the national authorities. Some, in fact, already are ahead of the federal policymakers.

Since Congress, however, reflects the will of all the people, representations to its members, not to mention the issues on which they run for office, must be backed up by public thinking. The grass-roots job, therefore, is getting the facts to the public and creating the understanding that will result in action for the good of all and not the few. Since workers for wages constitute a large segment of the public, the problem finally gets down to what they think.

If workers were really aware of the hazards of labor-leader monopoly power and conscious of the benefits of working more closely with their employers to render a better service to the public, much of the trouble now plaguing the nation would disappear. At the moment, the worker hears little but one side of the matter. The employer is the logical person to present the other side and, in addition, has perhaps a little more to gain or lose, although in the long run not much more than the employee.

Facts Must Be Told

Getting the facts to the worker and to all the other people making up the general public therefore becomes the No. 1 job. Few facts have gotten through the flood of propaganda by union leaders and their supporters and well wishers within the government and outside in the past. One reason is that employers have not risen to the occasion, although that situation is changing.

Fair treatment, a fair share of the income from joint effort to provide a better product at a lower cost and good working conditions are obvious starting points. These are vitally important but even they are not enough. Real teamwork—and real interest in eliminating monopoly labor-leader power with all its hazards—can be achieved only when the employee is given the facts and shown that such teamwork will benefit him more than allegiance to a labor leader.

The methods are numerous: personal talks, letters, bulletins, company publications and the many activities that bring home to the employee his identification with the company and the industry, such as baseball and bowling teams on the one end and joint labor-management and safety organizations on the other. With satisfactory wages and working conditions, anything that can be done to make the employee think of himself as a part of the company organization is a step in the right direction.

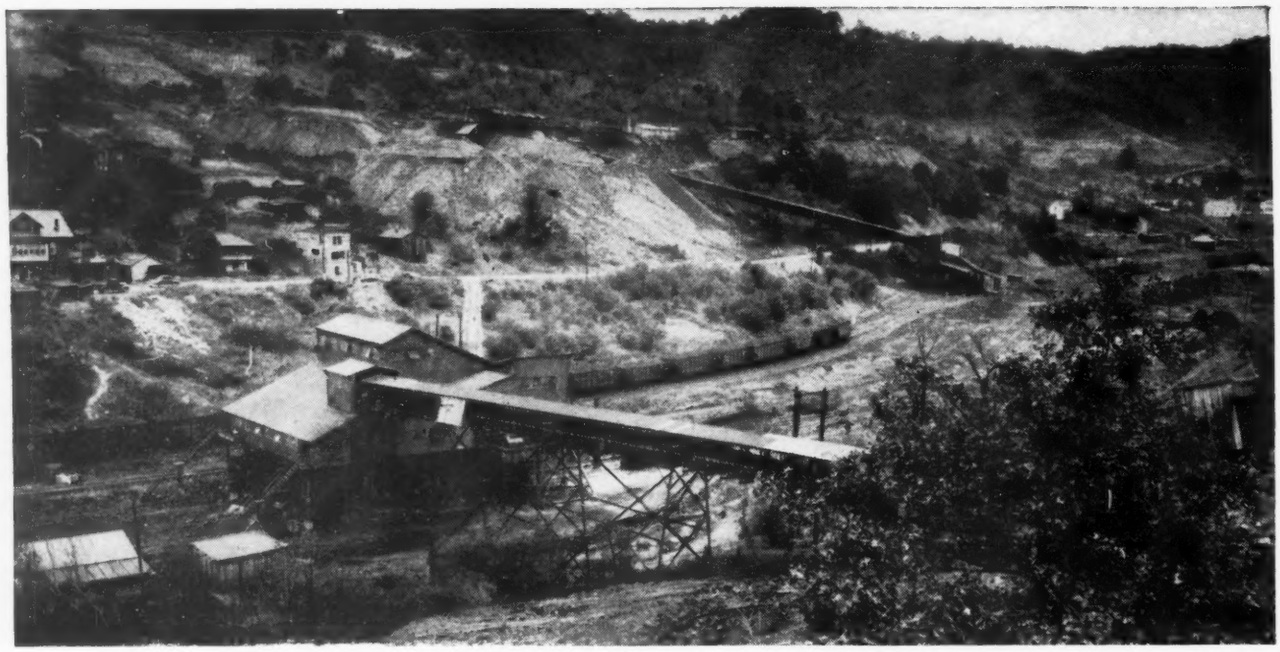
Labor leaders and their supporters bank on lack of understanding by the worker and the public and the consequent willingness of both to accept their dictation in employer-employee relations under the mistaken impression that it is the better way to real gains for both. Better counsel, at the moment, can come in large measure only from the employer. The answer is plain—more and better work by the employer in promoting employer-employee teamwork at home and in getting the facts to the public abroad.

Individuals Can Help

It is a job that cannot be left entirely to a national organization. Real results cannot be obtained without individual participation. Each company and each manager must make work with his employees and with his neighbors and the public in his reign a major part of his job. In the long run, creating favorable employee and public opinion is a matter of selling individuals. Being closest to the individuals in his organization and in his neighborhood, the individual employer or manager is in the best position to get results.

The road to labor peace is no easy one. If nothing else, federal legislation and propaganda have seen to that. Radical revision or repeal of federal laws and a change in administrative policy are helpful and, in fact, necessary steps. But that alone will not undo the damage resulting from some 15 years of exercise of monopoly power. A change in worker and public thinking and the building of real teamwork between employer and worker are the big answers.

While, as stated, the problem is no easy one, labor-leader excesses have fertilized the ground and provided the employer with a better opportunity to get the facts over than in many years. The big job is making the worker feel he is a part of an employer-employee team, coupled with creating public understanding. The ammunition is facts. Properly presented—a job not only for industry but for each individual employer—the facts will generate the worker and public attitude that will render legislation and labor leaders unnecessary, thus bringing to an end the possibility of abuse of monopoly power. The job, to again repeat, is not an easy one, but if done is the real solution.



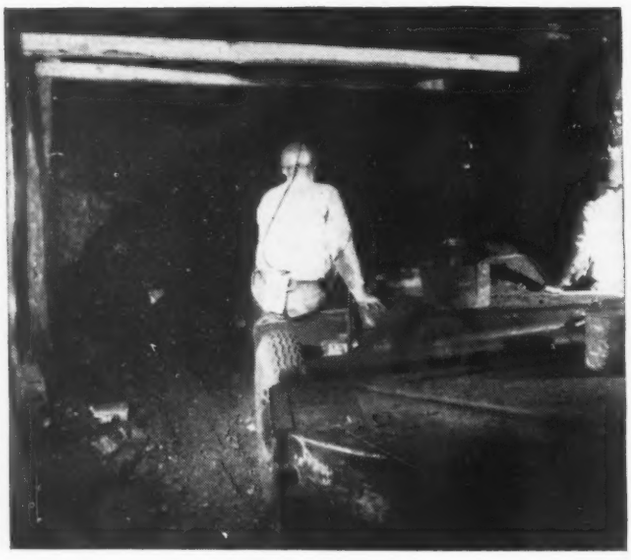
LOWER SECTION of the new belt conveyor and No. 3 tipple in the foreground. In the distance is the tipple for No. 2 mine, which will be worked out within a few months.

Building Up Galloway

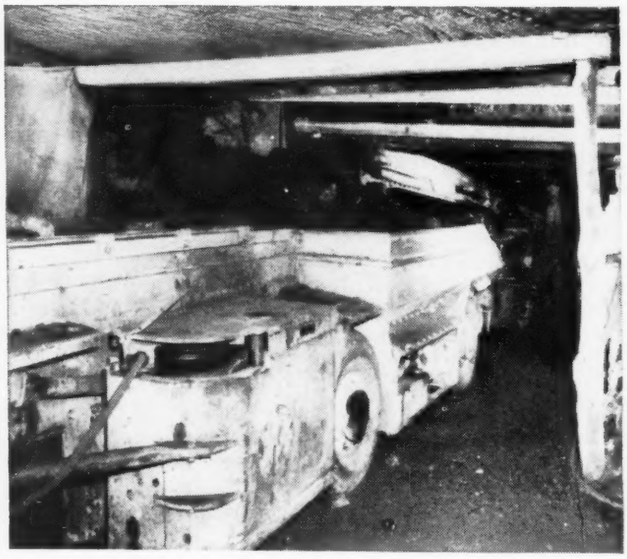
Simpson Creek Tonnage and Efficiency Consistently Boosted as New Equipment and Methods Take Hold—94 Percent Recovery Secured With Mobile Loaders—1,600-Ton Operation Upped to 10,000-Ton Capacity in Less Than Three Years

By J. H. EDWARDS
Associate Editor, Coal Age

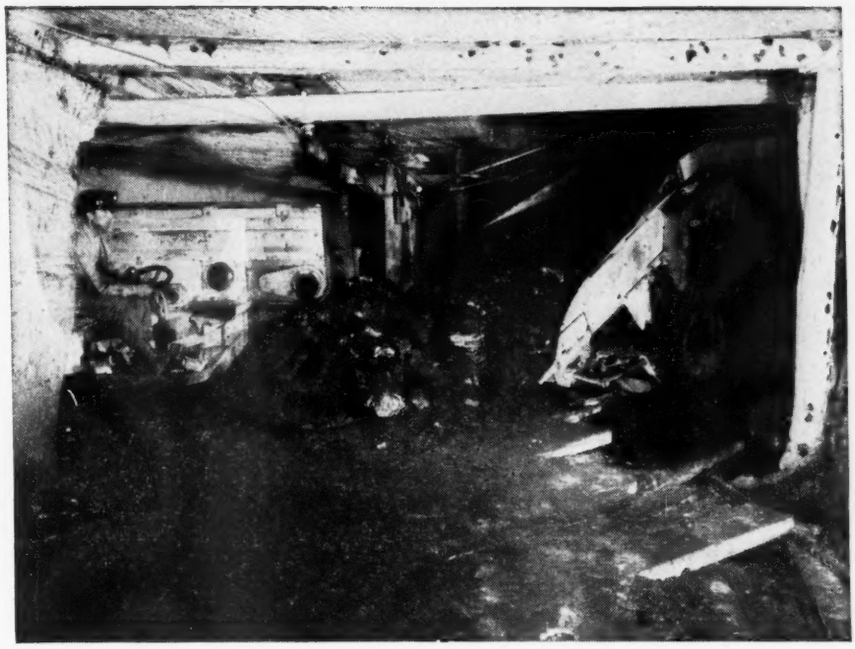
IN LESS THAN THREE YEARS after The Simpson Creek Colleries Co., Inc., Galloway, W. Va., was taken over by New York interests, production has been increased from 2,700 to about 10,000 tons per day. At the same time modernization of the underground and outside plant was being pushed to the limit of availability of machinery and materials. During this period pillar mining with mobile loaders was developed and systematized until re-



RUBBER-TIRED cutting machine has completed a top cut and is starting to shear.



CRAWLER-MOUNTED loader in a heading discharging to a four-wheel-drive four-wheel-steer shuttle car.



SHUTTLE-CAR ELEVATOR discharging into mine cars is set at an angle so that shuttle cars can dump to it from two roadways. This operator has just dumped his load.

covery is now over 94 percent. The latest equipment for face preparation, loading, transportation, dumping and tipple facilities have been installed under this continuous modernization program.

The record testifies that the new owners have done a good job in picking management, engineering and operating talent. Headquarters of the organization are in New York City and the burdens of local management at Galloway are carried by Harry Swihart, vice president in charge of operations, and his assistant, J. A. Farinash. Paul Bashforth is superintendent of Galloway No. 3 and Amos Csutorus is superintendent of No. 2 mine. R. W. Wotring is chief engineer; B. D. Wiseman, local purchasing agent; G. E. Auvil, chief electrician; Charles Barrett, safety engineer; and Joe Mellie, master mechanic.

Galloway No. 2 mine has but a short life remaining and investment consequently has been limited to mechanical loaders and a few absolute necessities. Galloway No. 3, the larger producer, has sufficient tonnage in sight so that the owners have felt justified in investing a large sum for equipment to mine the coal at the lowest possible cost. Both mines, opened in 1918, are in the Pittsburgh No. 8 seam. The tipples are located near each other at Galloway, in Barbour County, on the Astor Branch of the B. & O. Ry. and 15 miles bee-line east of Clarksburg.

When the company was acquired in August, 1944, Mine No. 2 was producing 1,100 tons hand-loaded onto shakers. Mine No. 3, reopened in 1943 after a shutdown of 11 years, was producing 1,600 tons, part hand-loaded onto shakers and part hand-loaded into cars, with gathering done with horses. The first move by the new management was to replace the hand-loaded shakers in No. 2 with re-conditioned track loaders. Later, some of these machines were replaced with Joy 8BU and 11BU loaders. This mine is being worked out with the original 2-ton wooden mine cars. Daily production was soon stepped up to 2,300 tons daily but now, with only a few months of operation left and all coal coming from barrier pillar extraction, output has dropped to 1,400 to 1,600 tons per day.

Mine No. 3 also used 2-ton wooden mine cars and its output was handled over a two-track tipple equipped only with bar screens and shipping mostly mine-run. There were limited shipments of $\frac{3}{4}$-in. slack and plus $\frac{3}{4}$-in.

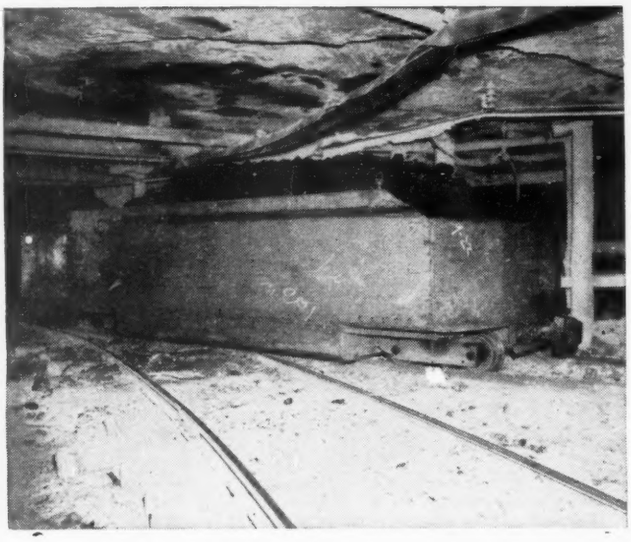
The seam in Mine No. 3 is 96 in. thick and, although generally level, the bottom is rolling in places and grades of 4 percent are encountered. Regular partings characteristic of the seam in many other sections are absent and there is no rooster coal above the drawslate. However, the seam is interspersed with small clay veins, which are difficult to cut and require timbering the top on each side of them.

TRACK-MOUNTED unit loading in 3rd Right territory discharges directly into mine cars.

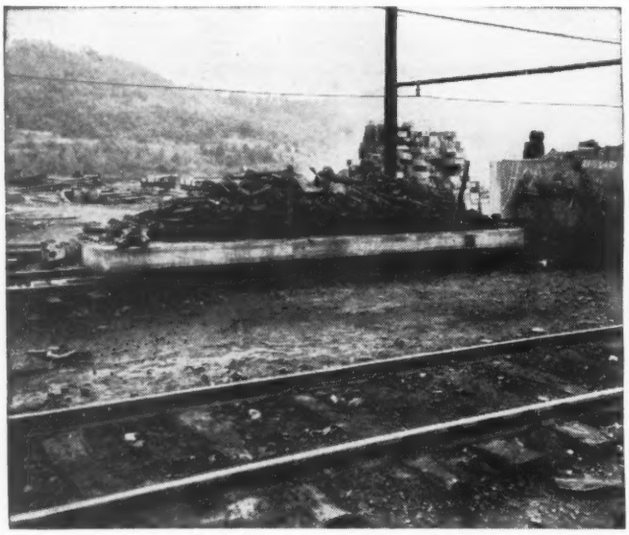
OVERCAST on 2 East Main is one of six built of steel tunnel liners. The full-length sections weigh only 41 lb.

SERVICE FACILITIES AT GALLOWAY NO. 3

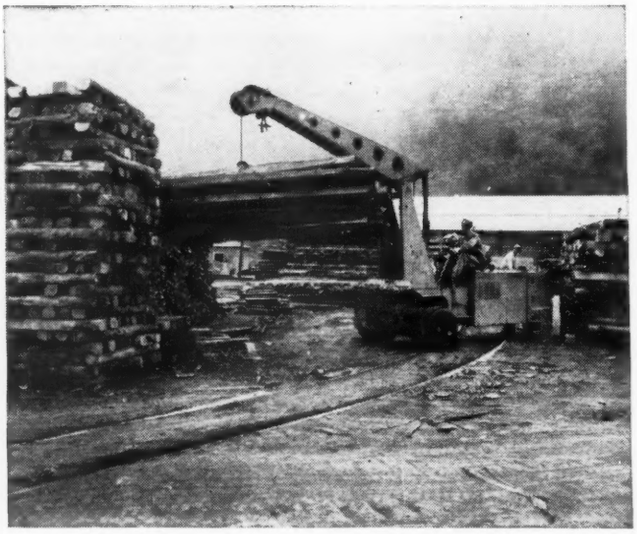
PERMANENT TIMBERING consists of crossbars saw-tooth hitched into a sheared rib. Tom Perry, general mine foreman, stands under permanent timbering in No. 2 Heading in 2 Right West Heading.



NEW-EIGHT-WHEELED mine cars have a weight capacity of 12 tons and average 10 tons of coal loaded. They are equipped with automatic couplers. Main-line track was upped from 40 to 60 lb.

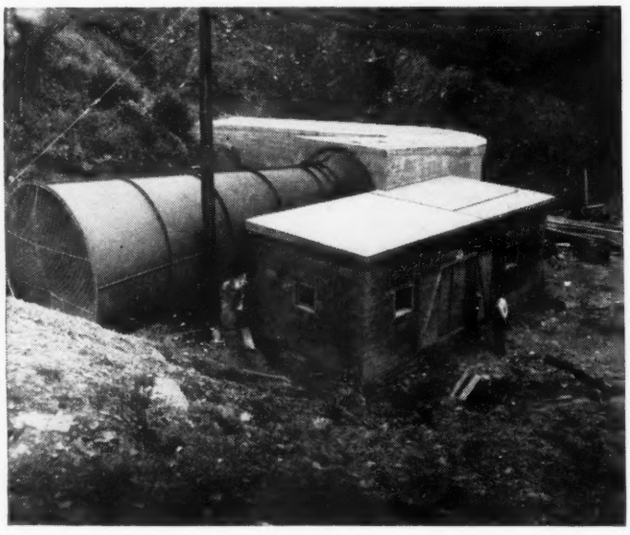


THE FIVE NEW eight-wheeled supply cars have a flat bed 7 x 18 ft. and a rated capacity of 12 tons.



SELF-PROPELLED gasoline-powered crane added to the supply yard here picks up and carries 14 crossbars 14 ft. long in one bundle.

AUTOMATIC SCALE records car weights as the cars approach the chain haul feeding them through the rotary dump.



NEW 8-FT. FAN powered by a 600 hp. synchronous motor was placed at a drift opening near the Camp Run portal.

Simpson Creek Modernization Schedule

1. Installation of six reconditioned Jeffrey L-400 track-mounted loading machines.

2. Installation of six Sullivan 7AU track-mounted cutting machines.

3. Increase in rail weights from 25 to 40 lb. in the working sections and 40 to 60 lb. in the mainline haulageway.

4. Installation of rebuilt 6- and 8-ton cable-reel locomotives to replace horses.

5. Construction of an outside substation at Camp Run (see Fig. 1), and installation therein of one reconditioned 200-kw. 275-volt rotary converter, with installation eight months later of a reconditioned 500-kw. converter beside the first unit.

6. Erection of a mine office and lamp house at the haulage portal near the tipple (since replaced by another lamp house and office at Camp Run).

7. Installation of 200 new 10-ton eight-wheeled Differential mine cars equipped with Willison couplers and a new headhouse including a rotary dump, December, 1945.

8. Installation at Camp Run of a new 8-ft. Jeffrey Aerodyne fan with 150-hp. induction motor, delivering 130,000 c.f.m. at 1¼-in. water-gage (large motor later installed to increase air).

9. Sale of the two original 150-kw. m.g. sets from the pit-mouth substation; removal of the 200-kw. set from the Camp Run substation; and installation of another reconditioned 500-kw. 275-volt converter at Camp Run.

10. Installation of three Goodman Type 460 track-mounted loading machines (two new and one reconditioned—two in operation, the other a spare) to replace the original track machines.

11. Installation of nine Joy 11BU crawler-mounted loading machines (eight in regular use, one a spare).

12. Utilization of steel tunnel liners for overcasts, February, 1946.

13. Addition of six new Sullivan 10RU rubber-tired cutting machines with 9-ft. cutter bars, five Joy tire pumps and four Sullivan spotting hoists (two Brown-Fayro hoists which came with the shaker equipment also are in use).

14. Installation of 10 7-ton four-wheel-drive, four-wheel-steer Joy Type 5SC shuttle cars, five of the largest Joy elevators and two reconditioned Sullivan 7AU cutters (eight shuttle cars are in regular use in four mining sections; two serve as spares).

15. Addition of five Differential eight-wheeled flat cars for carrying timber, rail and supplies.

16. Installation of a Lee-Norse grease truck, with which two men can grease a loading machine in 10 minutes and lubricate and inspect 14 machines a shift.

17. Installation of two Lee-Norse mine jeeps equipped with plexi-glass windshields.

18. Addition of a third 500-kw. rotary converter (underground).

19. Installation of a Hyster, a self-propelled gasoline-driven crane, with a considerable reduction in the cost of handling timber and supplies in the yard resulting.

20. Replacement of the apron conveyor from the headhouse to tipple by belts, April, 1947, with increased capacity and reduced maintenance cost.

21. Addition of a fourth 500-kw. rotary converter (installed on the surface at the top of a borehole).

22. Operation of a new four-track steel tipple begun June 15, 1947.

23. Replacement of the temporary 150-hp. induction motor of the new fan with a 600-hp. synchronous motor, with air increased to 330,000 c.f.m. at 2.4 water-gage (the mine is classed as gaseous).

24. Opening July, 1947, of a new man portal (drift opening) at Camp Run, reducing underground travel by 1¼ miles.

25. Setting up of a deepwell turbine pump and two 50,000-gal. steel tanks on the hillside for supplying an underground spraying and sprinkling system.

26. Completion of new maintenance shop of concrete blocks and steel near the headhouse. (Building is 60x100 ft. with an eaves height of 18 ft. A 40x100-ft. room contains the repair pits and another room, 20x100 ft., houses the machine shop, with a small space given over to a shop office and to a shower room for the mechanics.)

27. Addition of 50 new Bethlehem 10-ton eight-wheeled all-steel mine cars.

28. Installation of the first Joy rubber-tired timber setter Nov. 1, 1947 (rubber-tired and track-mounted units are on order to equip all working sections of the mine.)

29. Addition of seven Differential 35-man covered man-trip cars, thus increasing safety, comfort and speed of man transportation and releasing to production about 25 mine cars formerly tied up at the end of each shift.

30. Installation of the first new Joy rubber-tired hydraulic coal drill in a shuttle-car section (others are on order to completely equip the sections).

31. Installation of an underground cable to supply 2,300-volt power to the underground substation.

32. Ordering of three Jeffrey 56A track-mounted drills for use with the three Goodman loaders.

33. Ordering of a Joy crawler-mounted post puller which will recover 85 to 90 percent of the crossbars in pillars, as compared to 25 percent by present method.

It is the company's intention to replace within the near future track-mounted units in several operating sections with rubber-tired equipment, by adding six shuttle cars to present equipment.

Above the seam there is a strong soapstone, and on top of that a massive stratum of limestone or sandstone. The mine bottom consists of 6 to 8 in. of hardpan on top of 6 to 8 ft. of fireclay. Where water is encountered, sumps must be dug for drainage and roads for shuttle cars must be planked.

Mine No. 3 is a drift operation, with the haulage portal 150 ft. above the railroad tracks of the tipple. Seam elevation is 1,200 ft. above sea level. The country is hilly and cover ranges up to 300 ft. When the mine was taken over, the tracks were 25-lb. steel rail in the working sections and 40-lb. on the main haulageway. Six- and eight-ton swing locomotives were in use and the main haulage was handled by one 10-ton and one 13-ton locomotives.

Increased production was set up as the first goal by the new owners, with higher efficiency the second. Safer operation was the third ob-

FIG. 1—LAYOUT of Galloway No. 3 mine. The 10 sections now being worked are indicated by the circles.

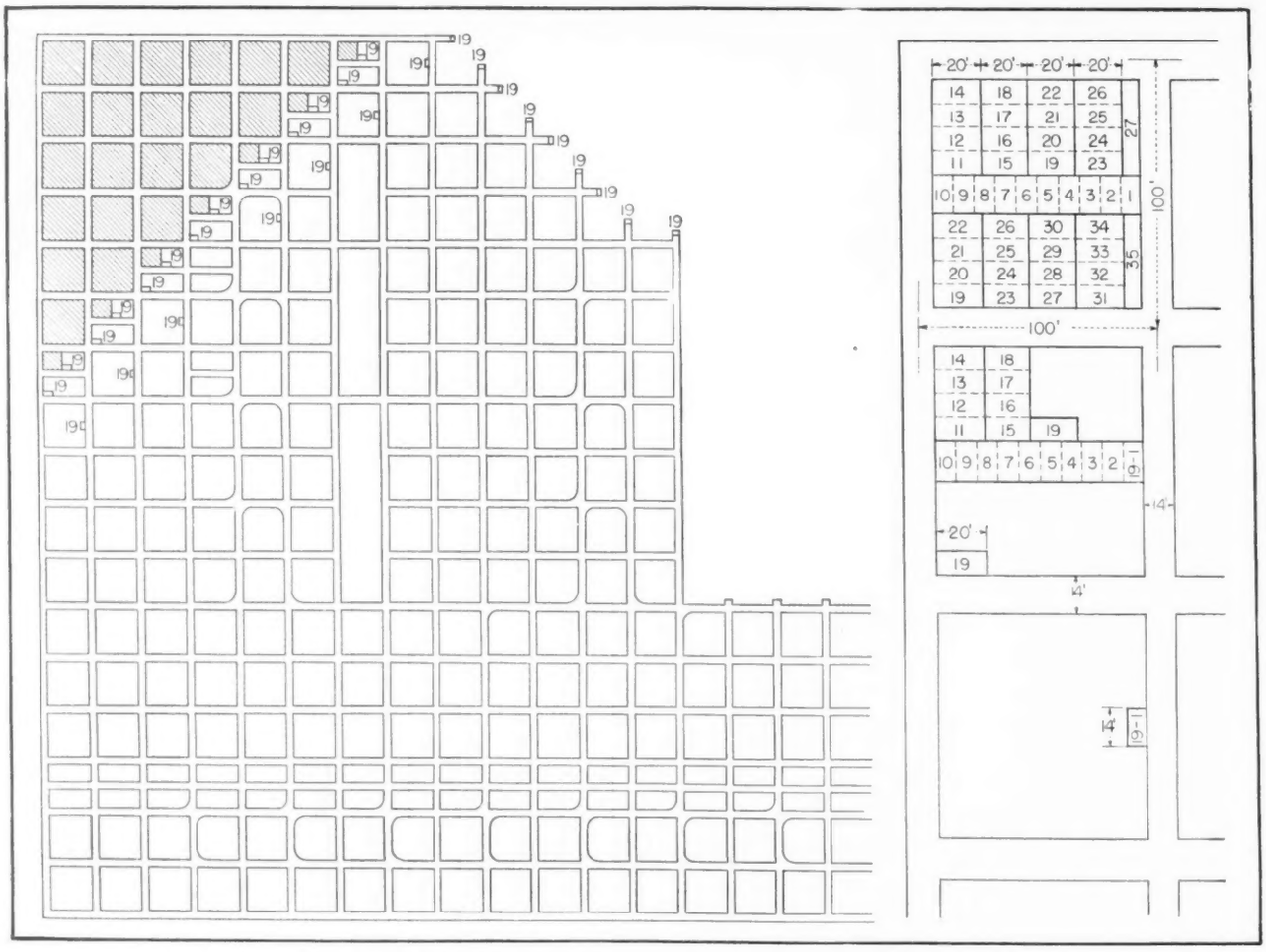


FIG. 2—THIS PILLAR RECOVERY and development sequence makes possible recovery of 94 to 95 percent of the coal.

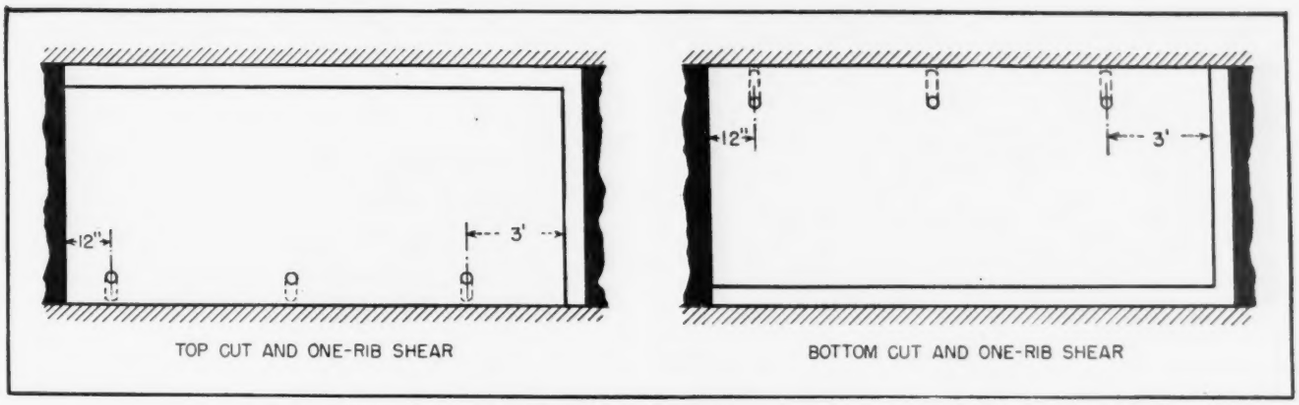


FIG. 3—DRILLING AND SHOOTING pattern for top- and bottom-cut rooms at Galloway No. 3.

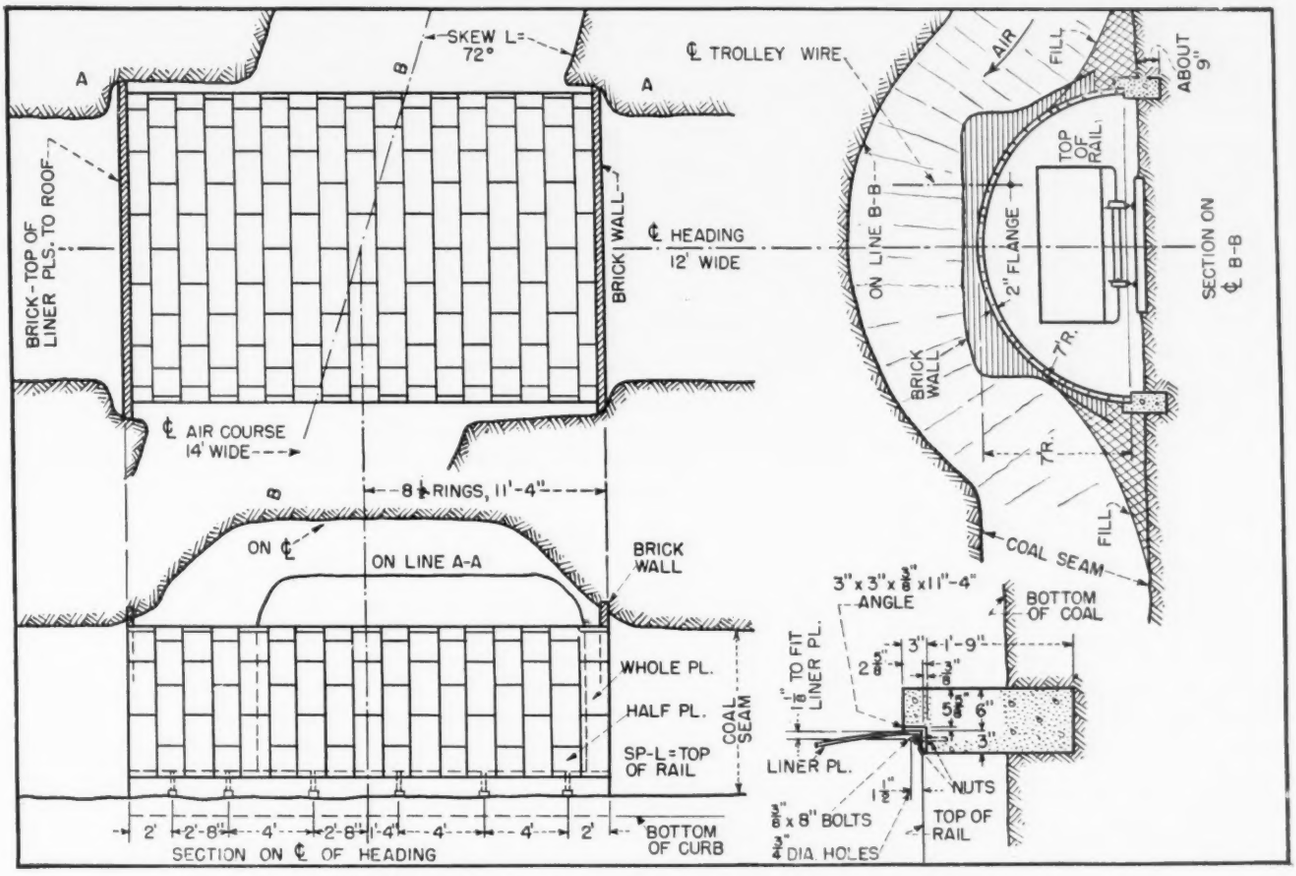


FIG. 4—SEMI-CIRCULAR STEEL PLATE utilized in the construction of these overcasts save labor and are recoverable.

jective, emphasized concurrently with the other two. With the existing 2-ton wooden cars and one crossover dump, production was raised to 3,000 tons per day of two 8¼-hr. dumping shifts.

Slow deliveries of new machinery and shortage of building materials were serious handicaps in rehabilitation of the operation. Since the worst conditions were attacked first, temporary expedients to step up production and help pay the way for the permanent improvements were required at several points.

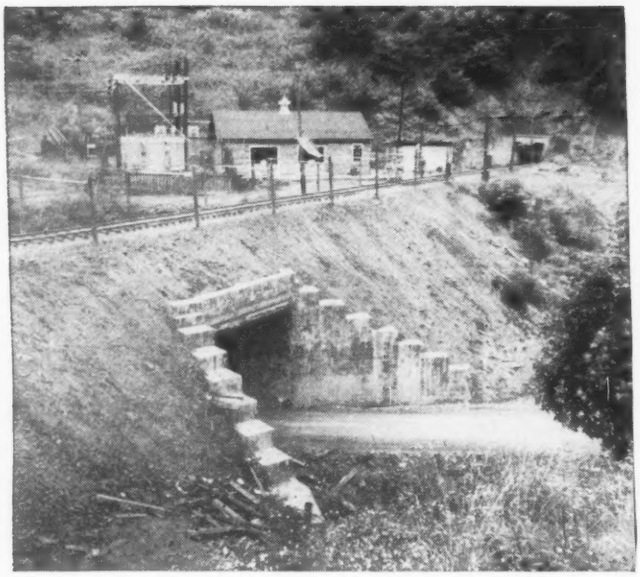
Successive steps in the modernization program for Mine No. 3 are outlined in the accompanying summary in the order in which they were taken. Certain features of the jobs and phases of operation will be considered later in this article.

Of the 10 sections now being operated in the mine, four have shuttle-car gathering. Two are on development and two on retreat. All use Joy 11BU loaders and Sullivan 10RU cutters. For the period of a month with the present working hours, the average production per shift for the four sections was 520 tons, with 17-man crews and some delays from a shortage of mine cars. With timber-setting machines, 15 men are required per crew.

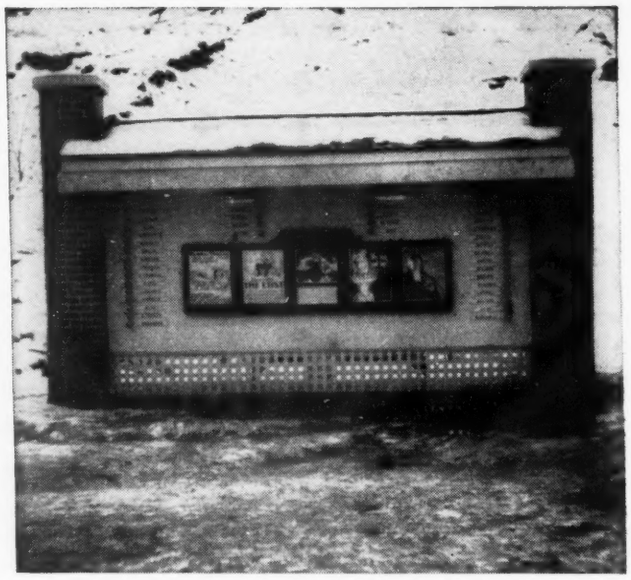
Shuttle-car elevators are set at 45-deg. angles to the development center lines, thus permitting shuttle cars to approach and dump from two roadways intersecting at 90 deg. A loaded shuttle car can come within 10 ft. of the elevator while another car is still dumping.

Cables of the shuttle cars are center-hung. This arrangement gave trouble until, at the suggestion of Leonard Bell, section mechanic, tension coil springs were added to the cable guide arms to snap them back into high-torque position. For an illustration and further details of this attachment, see p. 116 of this issue.

In two mining sections, Goodman 460 track-mounted loading machines deliver into mine cars. Cutting is done with Sullivan 7AU



MAIN HAULAGEWAY and substation at Camp Run. Improvements at this new portal included widening and grading 1¾ miles of country road to connect with the state highway.



BULLETIN BOARD at new man-portal provides ample space for safety messages and production ratings. Increased production, higher efficiency and greater safety have been the company's goals.

track-mounted cutters. One of these sections is on development and the other is taking pillars on retreat. A crew consists of 14 men and the average output for both machines for one month was 367 tons per machine per shift.

In four sections, Joy 11BU loaders load directly into mine cars. Here, also, cutting is done with 7AU machines. Three of these sections are on development and one on retreat. The performance average is 330 tons per shift.

These average tonnages were recorded after the new portal had been put into use and thus after travel time had been cut and time at the face increased. However, the last 50 mine cars had not been received and put into use.

In the track sections, cars are handled by one 8-ton cable-reel locomotive per loading machine. This gathering locomotive travels only 100 to 500 ft., bringing from the side track the three or four cars sufficient to clean up a cut. A swing locomotive gathers right into the section, with the track next to the active workings left as a side track for it.

In four of the 10 sections, top cutting is the practice and 10 to 12 in. of top coal is left, if possible. The top cutting is done with Sullivan rubber-tired units. In six sections, the full seam is taken and bottom cutting is the rule. A shear cut is made on the rib on the operator's side in all sections.

Water is used on all cutter bars to allay dust at the source. Some cutting machines are equipped with water tanks and water for the others is supplied by pipe and hose extended to the working places.

The timbering plan used in all sections calls for crossbars set on wood posts erected on 4-ft. centers, or closer. In No. 1 East territory, four sections are working in top so bad that crossbars must be placed on 2-ft. centers.

Block System Employed

As indicated by the mine map and pillar-recovery plan (Figs. 1 and 2), the block system is used. Centers are 100 ft. apart and all development places are driven 14 to 15 ft. wide, making the pillar blocks nominally 86x86 ft. Cuts in pillars are 18 to 22 ft. wide. By first splitting the pillar through the center and then meticulously following the plan and sequence of pillar recovery shown in Fig. 2, only six small stumps are lost and recovery of the block is 94 to 95 percent. The stumps are wedge-shaped, about 9 ft. long, 4 ft. wide at one end and 3 ft. at the other.

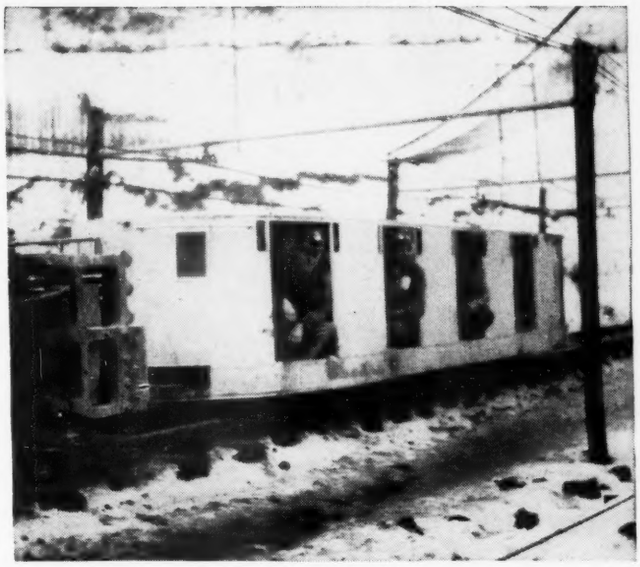
In 1945 a 6-ton General Electric locomotive was converted into a post-puller, one motor being used to drive a drum and the other to propel the locomotive. Both sets of trucks of the locomotive have power and are connected by chain and sprockets. In 1947, a Joy Type PP3-1PE crawler-mounted post-puller was purchased for the trackless sections.

These post-pullers are used to make falls and recover timbers. Falls must be made at the proper time to relieve pressure and prevent heaving conditions. The recovery of crossbars and timbers depends upon the conditions and the number of falls to be made. Up to 40 bars and 40 to 45 posts have been recovered in one shift with one post-puller.

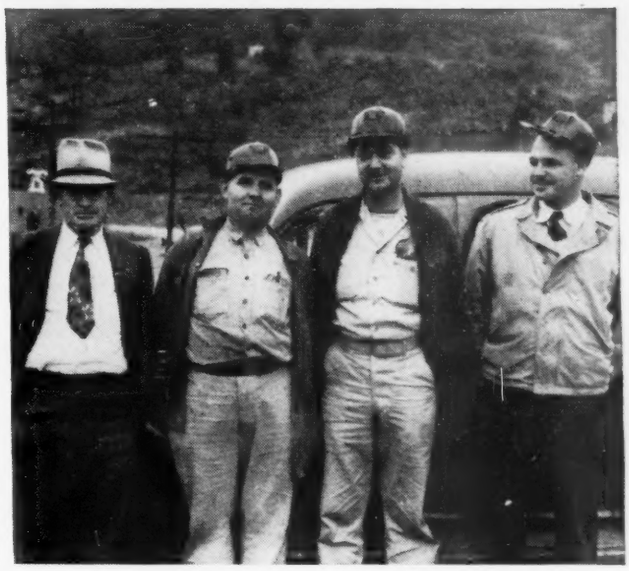
As yet no standardization has been set up for cutting bits and chains. Plain Warwood bits are exclusively used, with experiments underway on Sulmet, Kennametal and Bowdil products. Coal is drilled with Kennametal and Hardsocg Double Diamond bits. Du Pont Monobel AA is used for shooting.

Tunnel liners of 3/16-in. copper-bearing steel have been adopted for overcasts, principally because of labor savings in erection. The cost of transporting the material into the mine also is less and the steel is recoverable. When the individual sections are bolted together for a half circle of 7-ft. radius and bolted to concrete curbs 6 in. higher than the track, a maximum roof clearance of 7½ ft. above the rail top is provided.

The individual sections are used in two lengths to permit staggering joints. The full sections are 16x 37 11/16 in. and weigh 40.68 lb. The half sections are the same width but half the length. A standard overcast for a 14-ft. heading crossing at 72 deg. consists of 17 rings and thus requires 111 full sections and 16 half sections. Sections are connected with ⅝x1½-in. quick-acting bolts and, after erection, both sides are painted with Clariton pitch paint to make all joints air-tight. These tunnel-liner units were manufactured by the Commercial Stamping & Shearing Co. Six over-



ABOUT 25 MINE CARS tied up at the end of each shift were released for coal haulage by purchase of seven of these 35-man covered man-trip cars.



OPERATING PERSONNEL include: Harry L. Swihart (left), vice president; Amos Csutorus, superintendent, No. 2 mine; Charles Barrett, safety inspector; and J. A. Farinash, assistant to Mr. Swihart.

casts are now in use in No. 3 mine.

A small door is placed in the concrete-block wall at one end of the overcast to give access to the airway. Rock-dusting on the airway outby the overcast is accomplished by pouring rock dust from bags into the open door. Air rushing through the door draws the rock dust into the airway. Dust placed in the overcast at 2 East Main, shown in an accompanying illustration, appeared at the fan 2,000 ft. away.

Crossbars Hitched in Rib

Crossbars for permanent timbering are hitched into the rib on the sheared side. This is known as "saw-tooth hitching," because rib holes are made with a cutting machine, with a resulting saw-tooth pattern. In the sheared rib, which is not weakened by shooting, the minimum hitch for the crossbar is 6 in.

Rated capacity of the Differential eight-wheeled supply cars is 12 tons. The flat bed of the cars is 7x18 ft. and the top of the bed is 14 in. above the top of the rail. Over-all length, including the Willison couplers, is 20 ft. Track gage in the mine is 42 in.

At the time haulage units totalled only 200 cars, very close supervision was required to approach a reasonable operating efficiency. Yet by achieving a car turn-over of 3½ to 4 times with that limited equipment, the mine output (on the nine-hour portal-to-portal work day) was upped to 7,500 tons a day.

Labor savings from the Hyster Karry Krane used in the timber and supply yard is expected to return the investment in less than three years. Capacity of the unit is 2 tons at a 10-ft. 8-in. lifting height and 5 tons at 19-ft. 4-in. In addition to lifting timber and materials to and from storage, trucks and cars, the Hyster is used for transporting loads considerable distances throughout the yard.

The new 8-ft. Jeffrey Aerodyne fan was installed at a drift opening at Camp Run near the substation and new mine office. The substation man also attends the fan. The adit between portal and fan was built with the approved 90-deg. turn and explosion doors at the corner. The new Westinghouse 600-hp. 2,300-volt synchronous motor and magnetic control will suffice for the life of the mine.

Although the new man-portal and office at Camp Run cut only 1¼ miles from the former underground man-haul, it provided a real boost to production. The portal is 2½ miles by highway from the tipple and operating offices at Galloway. Of this distance, ¾ mile is on the paved State Highway No. 77 and 1¾ miles over a country road that the mining company rebuilt from a narrow dirt road to a well-graded road surfaced with red dog. This Camp Run improvement included building an underpass to cross the mine haulage road. Equipment of the new lamp house at Camp Run consists of 600 M.S.A. Model P Edison cap lamps.

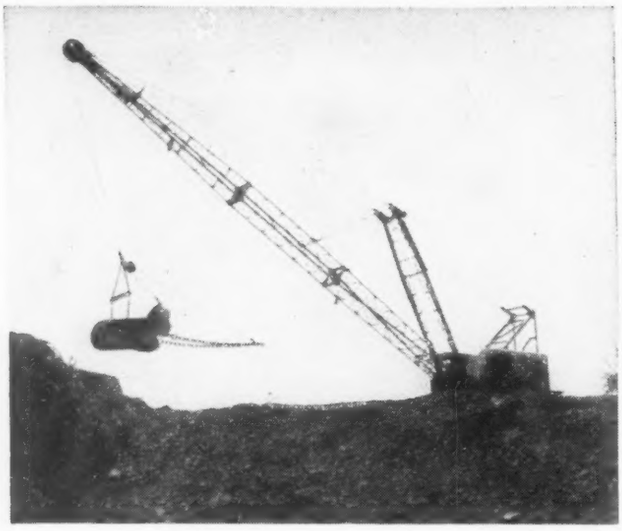
Tipple facilities installed at seam elevation for dumping the large mine cars consist of a Nolan chain haul and a Nolan rotary car dumper, both made by the Nolan Co., formerly the Mining Safety Device Co. Eighteen months after the new cars were put in use, the old apron conveyor from the dump house to the old tipple was replaced by belts. The top belt, declined 15 deg. 49 min., is 360 ft. long (center to center). A lower section, declined 3 deg. and 210 ft. long, connects the top section and tipple. Some run-of-mine is picked on a conveyor immediately below the dump bin at the headhouse.

Tipple Can Handle 650 T.P.H.

The new steel tipple, designed and built by Interstate Engineers, is equipped with a Fairmont 8-ft. shaker screen, two Allis-Chalmers double-deck vibrating screens, a McNally-Pittsburg pick breaker and four Fairmont car retarders. Picking is done on two belt-conveyor-type tables. Four sizes are loaded simultaneously. They normally are: ¾-in. slack, ¾x2-in. nut, 3x4-in. egg and 4-in. lump. The plant already has handled peak loads of 650 t.p.h.

As a result of the new equipment and improvements outlined, together with management's planning and follow-through, Galloway No. 3 mine has been lifted from a small producer of hand-loaded horse-gathered coal to a completely mechanized operation with a capacity of 10,000 tons daily. The company believes that with an adequate supply of railroad cars the mine can compete for top honors as the most efficient and largest producer in the state.

PRODUCTION FACILITIES AT WINGERT STRIPPING



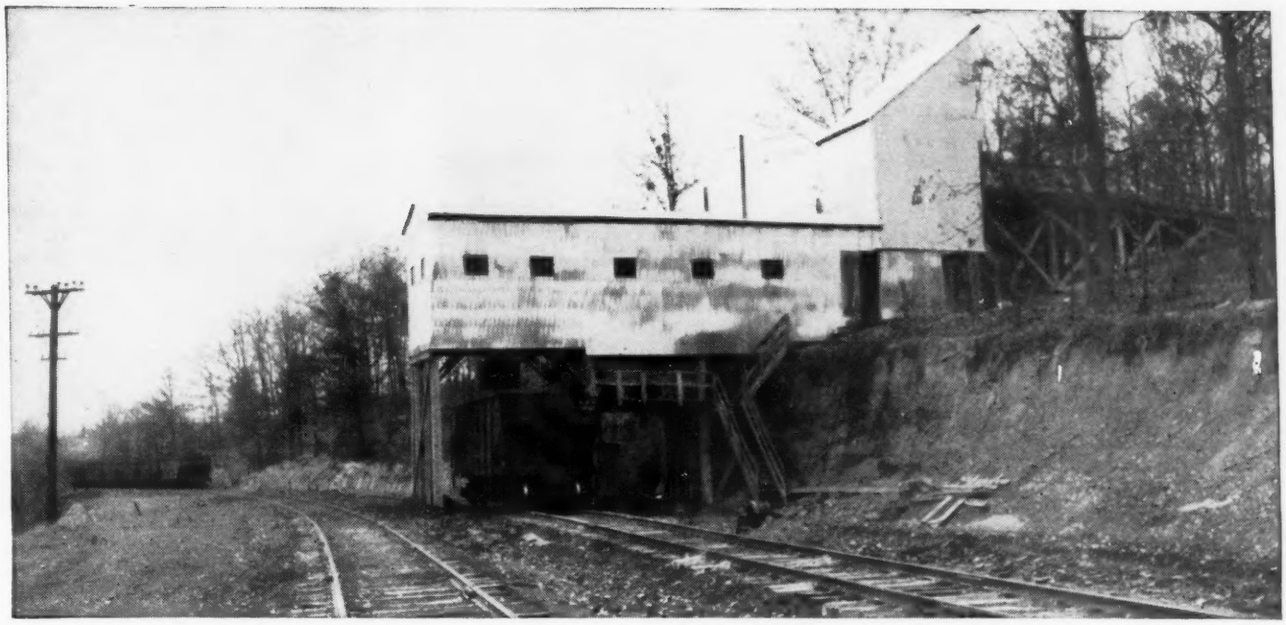
THE 4-CU.YD. DRAGLINE (left), with 80-ft. regular and 30-ft. auxiliary boom, strips up to 53 ft. Old pit (right) stripped to 30 ft. five years ago by 1½-cu.yd. shovel with 30-ft. boom, will be reworked to 55 ft. by Wingert with a 2-yd. shovel with 45-ft. boom and a 4-yd. dragline.

THIS SHOVEL being assembled at a Wingert pit is one of the new units the company has had on order.

FOUR of the company's 12-ton coal trucks. More are on order and will replace those presently rented.

ELECTRIC- and acetylene-welding truck includes a separate gasoline-driven lighting and power-tool unit for field work.

THE 4,000-GAL. SEMI-TRAILER diesel-fuel tank for storing deliveries has a gasoline-driven air compressor mounted on it.



NEW TIPPLE handles 150 to 200 t.p.h. The loading track is a siding connected to the main line at both ends.

Stripper Reworks Old Pits

With Larger and More Efficient Equipment, Wingert Contracting Strips up to 53 Ft. Areas Formerly Worked to 35 Ft. at No Greater Earthmoving or Coal Cost—Special Crusher Adds to Efficiency of New Tipple

BY UTILIZATION of larger and more efficient machinery, the Wingert Contracting Co., Inc., now is stripping up to 53 ft. of overburden in Clarion County, Pennslyvania—at the same cost of earth-moving, and no greater cost of coal, than when it stripped up to 35 ft. deep in the same pit a few years ago. In stripping, no earth is rehandled or hauled in wagons. In a new tipple recently completed, handling and picking of coal is facilitated by a variable vibrating feeder. Simplicity of the tipple layout was made possible by installation of a crusher of special design.

Lloyd I. Wingert, Butler, Pa., president and principal owner of the company, had his first experience in surface mining in Cameron County, Pennsylvania, in 1937. When this proved successful, the company discontinued the contracting of earthmoving and since that time has engaged in mining coal. Its second pit was in Jefferson County and in March, 1939, operations were moved to Clarion County, near Sligo, about 75 miles northeast of Pittsburgh. The company was the second to begin stripping in that county.

All the company's operations in this vicinity have been in the Lower Kittanning seam and coal thickness in the present Wingert pits, known as Lloyd No. 3, Lloyd No. 4 and Joyce mines, is 34 to 51 in. With the hill slopes of this rolling country, stripping to a 30-ft. highwall ordinarily yields coal widths of 150 to 500 ft.

Principal equipment now owned by the company includes:

2 P&H 4-yd. crawler-mounted draglines, each with 80-ft. boom and 30-ft. auxiliary boom, magnetorque drive that eliminates clutching, Buda diesel engine rated 220 hp. at 1,050 r.p.m., P&H buckets for stripping (one purchased two years ago, the other six months ago).

2 Manitowoc 3500 crawler-mounted shovels, each with 45-ft. boom and 34-ft. stick, driven by Caterpillar D-17 diesel engines—used for stripping only (one purchased a year ago, the other put into use in December, 1947).

1 Lorain 80 1½-yd. crawler-mounted shovel, 30½-ft. boom—for coal loading and also for stripping shallow overburden at night (new six years ago).

1 Northwest 80-D 2½-yd. crawler-mounted shovel, 27½-ft. boom, 18-ft. 4-in. sticks, driven by a Murphy diesel—for coal loading.

4 Allis-Chalmers HD14 crawler-mounted angledozers driven by General Motors two-cycle diesels—for the digging and moving of overburden.

1 Cletrac Model FDE crawler-mounted angledozer driven by a Hercules diesel—for digging and moving of overburden.

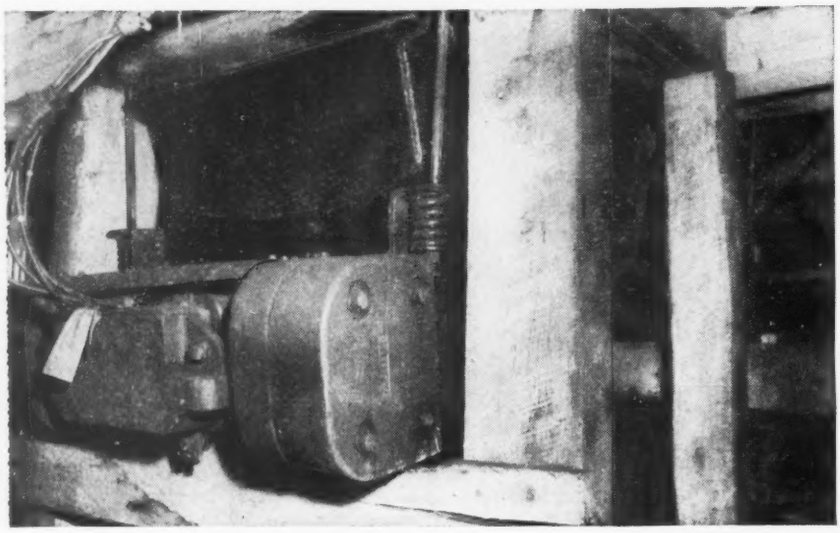
1 Allis-Chalmers HD-19 angledozer.

1 International Model I-14 rubber-tired tractor with a Hough 6-ft. rotary sweeper mounted on the front and a 2-in. centrifugal pump on the rear—for sweeping the coal top and pit pumping.

1 Stinson Reliant SR 10J airplane with a freight-carrying capacity of 600 lb.—used by officials on hurried trips and for getting urgent repair parts from shovel and equipment factories.

1 Schramm 105-c.f.m. air compressor driven by a Buda gasoline engine and mounted on four rubber tires — supplying air for spray painting, pumping truck tires and miscellaneous uses.

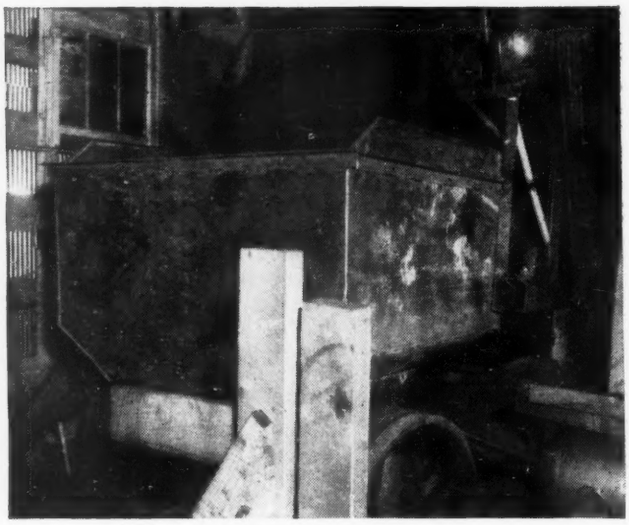
7 White WB28 gasoline-driven coal trucks with Galion hoists and



MAGNETIC VIBRATING FEEDER provides a wide range of adjustment from 200 down to 50 t.p.h. or less.

SELF-CLEANING tail pulley of the picking table below magnetic feeder.

THE FINGERS of the magnetic vibrating feeder bed the fine coal on the bottom on the belt and the lump on top.



THE MOTOR for the crusher's stationary roller is at the lower right; adjustable-position roller, off at the left.

special end-dumping bodies built by the Mayer Body Works, Pittsburgh —normal loading, 12 tons.

5 3-in. and 4-in. portable pit pumps powered by air-cooled gasoline engines.

1 Hobart 300-amp. gasoline-driven electric welder and a 3,000-watt 110-volt gasoline-driven lighting and power-tool unit, mounted on an International KB3 truck.

1 Dodge four-wheel drive "Power-Wagon," eight speeds forward, with a winch of 7,500-lb. capacity mounted on front—for use by superintendent and foreman.

2 ½-ton pick-up trucks (one a Ford and the other a Studebaker) —for use by superintendent and foreman.

1 Chevrolet ½-ton panel truck.

1 International 2-ton 500-gal. fuel-oil-delivery truck.

1 4,000-gal. fuel-oil tank on a semi-trailer.

To prepare for keen competition in the future, the Wingert Contracting Co., Inc., is purchasing more new equipment and, after its arrival, probably will sell some of its older and smaller machinery. The largest unit on order is a 5-yd. Manitowoc 4500 crawler-mounted shovel. Another Manitowoc 3500 similar to the ones already in use is scheduled for delivery in the second quarter of this year. The third shovel, a Lima 2½-yd. Model 1201 with a 45-ft. boom, was received in February and is being set up.

Rented Trucks Being Replaced

Some rented coal trucks now are employed along with the company-owned trucks, but to eliminate their use, more White WB28 end-dumping units are on order.

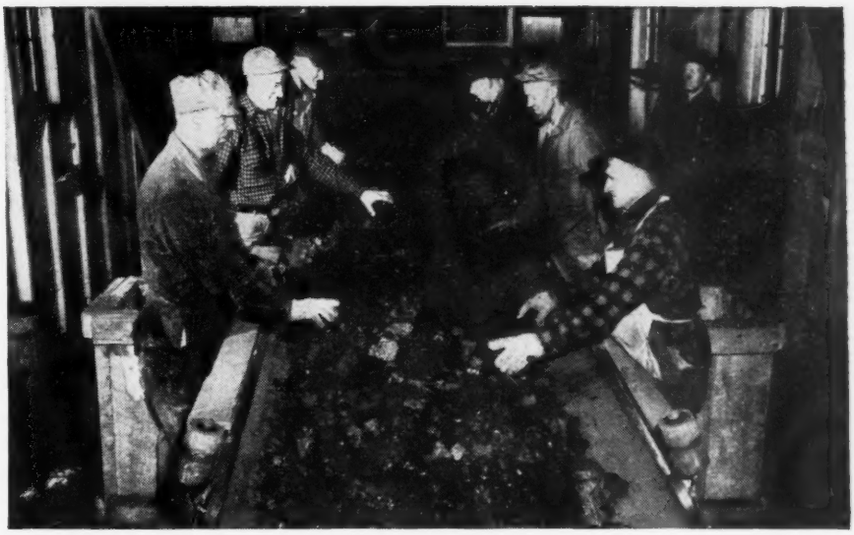
When the company first began stripping coal in the Sligo vicinity in 1939, it worked only to a 30-ft. depth and employed 1½-yd. shovels with 30-ft. 7-in. booms. Now the P&H dragline, back in this original territory, is removing 53 ft. of overburden.

Coal under as little as 8 ft. of cover is marketable in the Sligo area. But regardless of depth, shooting of overburden is not required. Coal also is dug without shooting.

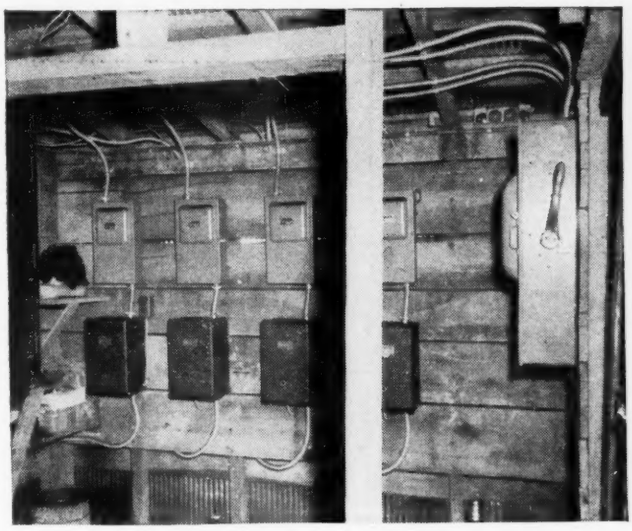
Angledozers are widely used for removing loose top soil. They push the dirt across the pit from which the coal has been loaded and thus level the spoil pile in the same operation, making it unnecessary to return at a later time to level the pile as required by the Pensylvania Reclamation Act. As much as 22 ft. of overburden has been removed by the dozers.

Although the coal seam is uniform and continuous, core drilling

SLOPE of the ramp is only 1⅛ in. per foot. The floor is self-cleaning.



BELT-CONVEYOR PICKING TABLE is 48 in. by 46 ft. Inclination is 3 deg. Pickings fall through slots to trucks.



CONTROLS ARE GROUPED in a special room and include a vibrating-feeder control and a 400-amp. safety line switch.

LLOYD I. WINGERT, president and principal owner of the Wingert Contracting Co., now exclusively in coal stripping.

is employed to determine the type of overburden and sample the coal. Sometimes, the crop is prospected with a bulldozer or small shovel. Individual farms purchased range from 30 to 100 acres and, as a rule, three core drill holes are made per farm.

Coal on some of the properties is leased on a tonnage basis, but for the most part, the properties are bought in fee, including buildings and mineral rights. Pit length usually ranges from 2,000 to 12,000 ft.

In one pit the coal lies 6 ft. below the creek level and its recovery requires considerable pumping. Early last November the machinery was moved to work only the two pits that are highest and driest. About June 1 the low-level pit will be again worked.

The bottom under the seam is very soft and, therefore, all haulage is on top of the coal, with the trucks standing on the coal for loading. Only one loading shovel is used in a pit.

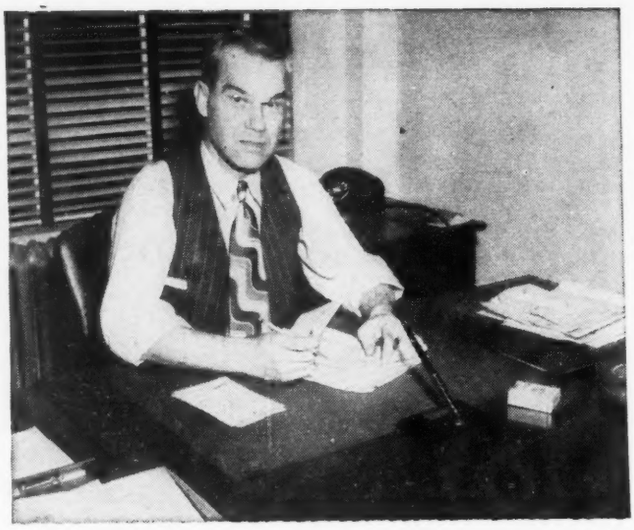
New Tipple Operating

The new tipple, rated at 200 t.p.h., is expected to handle 300,000 tons per year once the new stripping machinery arrives and the four pits are in full production. This tipple, one mile southeast of Sligo, on the Sligo Branch of the Pennsylvania R.R., has displaced rented tipples utilized by the company.

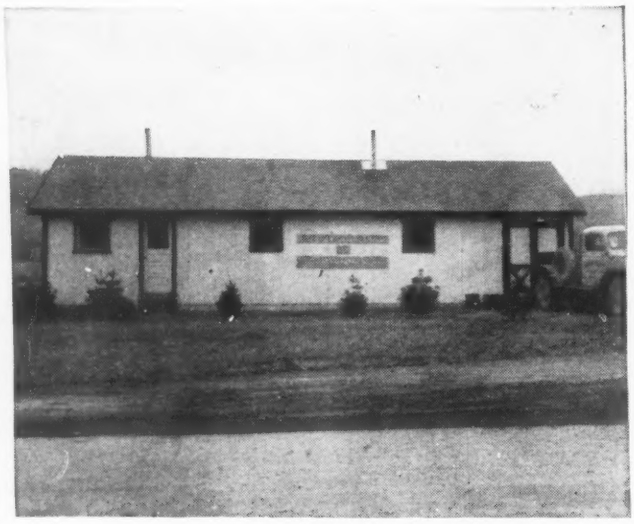
Briefly, the tipple consists of a truck-dump hopper bin with a capacity of 30 tons, vibrating feeder, 48 in. by 46-ft. belt-conveyor picking table and a double-roll crusher. Loading is done on one track, which is on a 2-percent grade and has switches at each end connecting to the main line so that the tipple need not be shut down when the switching locomotive sets in empties or takes out loaded cars. Railroad cars are controlled by a rope-and-drum retarder under the loading chute.

The crusher is mounted under the end of the picking-table belt and directly above the loading chute, with all coal going through it. For railway fuel, it is set to crush to 8 in. For steam coal, it can be set to crush to as small as 2 in. The crusher is a double-roll unit, with individual 10-hp. motor drives for each 24x30-in. roller, and was made to the company's order by the Scottdale Machinery Co. The bearing mountings of one roller are stationary while the mountings of the other can be adjusted to several positions. The driving motor of the second roller can be moved on its base to readily adjust the tension

WILLIAM I. WINGERT, vice president, at his desk in the field office with his Great Dane, who likes airplane travel.



C. W. PARK, secretary, assistant treasurer and chief accountant for the Wingert organization.



FIELD OFFICE, supply house and shop are conveniently near the center of the company's Clarion County operations.

A PART of the Wingert mobile equipment—power wagon with front winch (left), two pickups and L. I. Wingert's convertible.

of the single-reduction V-belt drive.

A third 10-hp. motor drives the picking-table conveyor via a V-belt, jack shaft and chain. Belt speed is 100 f.p.m. All three motors are Crocker-Wheeler Type SC 220-volt 1,735-r.p.m. units. The tail pulley of the belt conveyor is a Sprout-Waldron self-cleaning "Belt-Saver."

J. A. Lindy, tipple foreman, who designed and built the tipple, is particularly proud of the Syntron feeder installed between the dump hopper and picking belt. It is 30 in. wide and has a bar-screen section 18 in. long consisting of fingers 2 in. apart attached at the nose. It does an excellent job of bedding the fines on the belt and putting the coarser coal on top where it can be hand picked, he says.

With an electrical control knob that changes the number of vibrations per minute, the normal flow of 150 to 200 t.p.h. can be slowed to 50 or less. The feeder is installed on an angle of 14 deg. favoring the flow.

Electrical Controls Grouped

Power wiring is installed in flexible conduit and controls are grouped in a separate room. In addition to the Synton control box, there is a 400-amp. Trumbull safety-type line switch, four Wadsworth motor safety switches and four Monitor starters.

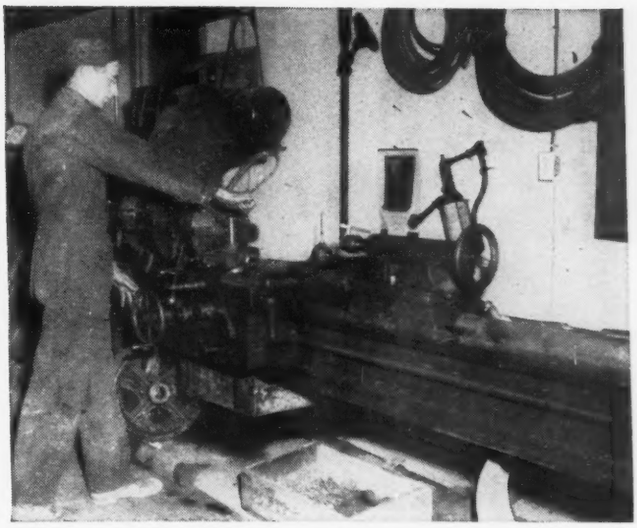
All outside posts of the hopper bin and tipple are set on a slope of 1 in. to 1 ft. to provide side bracing. Red and white oak was used in the construction. That part of the building housing the feeder, picking table and crusher is 16x64 ft. and 12 ft. to the eaves. Sides and roof are covered with corrugated 27-gage aluminum.

Pickings drop through chutes to a rock bin located between the loading track and the bank and are disposed of by a motor truck driven under the bin.

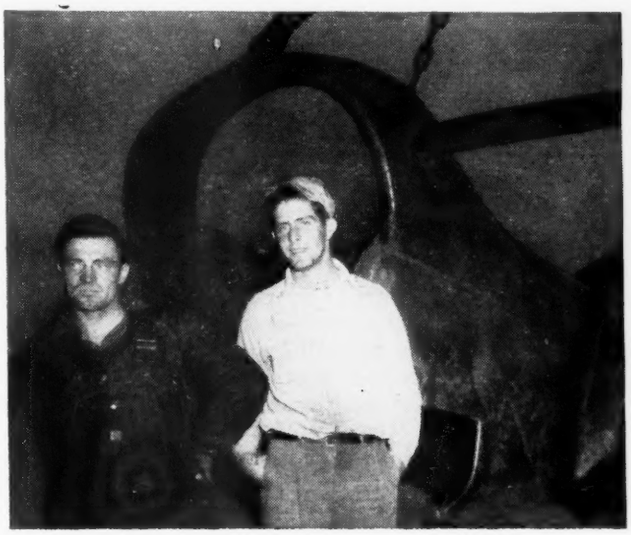
The coal-truck ramp leading up to the dump hopper has a slope of only $1\frac{1}{8}$ in. per foot and is constructed so that it is self-cleaning and "non-slipping." The oak floor consists of 3x5's set edgewise, with spaces $1\frac{1}{2}$ in. wide between. Trucks dump onto a grid of rails covering the top of the bin, with openings 16x16 in. All slopes in the hopper are 45 deg. and steel-lined, so that the coal never fails to run and the bin empties completely. At its highest point, the roof over the dump is 17 ft. above the ramp. Bodies of the 12-ton trucks require this height for clearance when fully tilted for dumping.

A 24-ton truck scale is installed close to the tipple ramp and the scale office was built large enough

DRAGLINE-BUCKET TEETH have been reclaimed by welding on new points and adding hard alloy in crosswise rows.



AMONG THE SHOP UNITS facilitating prompt, thorough maintenance is this 16-in. by 6-ft. lathe.



RUDY FINKBINNER (left), dragline operator, and Jay Myers, oiler, standing near the 4-cu.yd. dragline bucket.

AT THE PIT late in a rainy evening—Carl V. Aaron (left), general superintendent, Clarion County mines, and L. I. Wingert.

to serve also as the tipple office and watchman's quarters. Rented trucks are weighed, as is the coal purchased from small mines in the vicinity. The Hollis Machine Co., Scottdale, Pa., furnished the tipple equipment and also built the car retarder.

All Wingert production is shipped by rail, and the Pittsburgh & Ohio Coal Co., Cleveland, is sales agent. There are many small truck and strip mines in the vicinity that supply the local domestic trade. Mr. Wingert likes to compare the present price of $4 and above per ton with the $1.35 received when he began stripping in that vicinity in 1939.

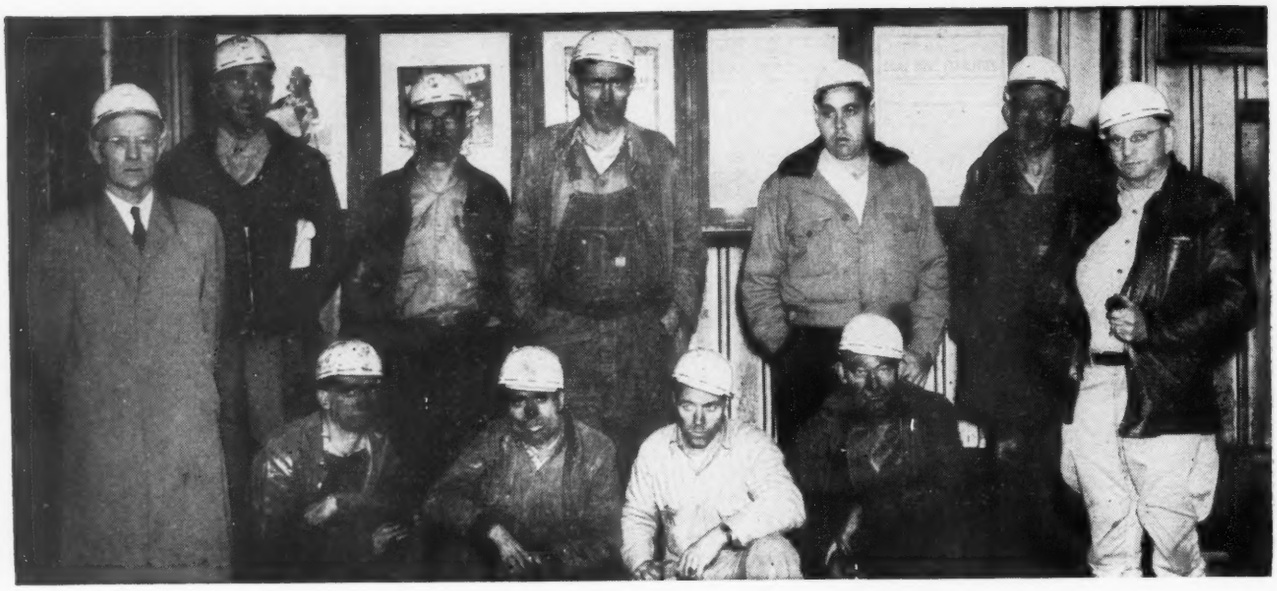
Prompt and thorough maintenance is gospel with Mr. Wingert. He also believes in frequent painting of equipment. One machine, for example, was repainted when it was only six months old. At the field office, located near the center of a 16-mile-diameter circle encompassing the company's operations, a neatly arranged parts room and a machine and welding shop are maintained. Tools include a Lodge & Shipley 16-in. by 6-ft. lathe. Shop welding is done with the portable Hobart welder. New tips are welded onto dipper teeth with "Manganol Titcote" and teeth surfaces are protected with crosswise beads of Stoody self-hardening rod.

Fuel Stored in Tank Truck

The 4,000-gal. semi-trailer fuel tank is permanently parked near the field office and shop. Purchased as army surplus, it is of the type used to fuel airplanes and has two tanks, one holding 2,200 gal. and the other 1,800 gal. Both tanks are used for storing diesel fuel delivered directly from the refinery. Equipment on the semi-trailers includes a four-cylinder Wisconsin engine driving an air compressor. Fuel oil is pumped from the semi-trailer to the 500-gal. tank of the International 2-ton truck which delivers to the pits.

Mr. Wingert's 24-year-old son, William L. Wingert, is vice president of the company with headquarters at the field office. Carl V. Raron is general superintendent of Lloyd No. 3, Lloyd No. 4 and Joyce mines.

General offices of the company are in the Butler Savings & Trust Co., Butler, Pa. C. W. Park is secretary, assistant treasurer and chief accountant. The Wingert company also operates in Noble County, Ohio, where it has been stripping the Pittsburgh No. 8 seam for two years. The Wingerts have found the Stinson airplane particularly useful in business travel.



WHITE HATS bought by the company and worn by safety committeemen and union and company officials add punch to the safety drive at mines of the Lillybrook Coal Co., Beckley, W. Va.

Teamwork for Safety

Emphasizing Direct Benefits Sells Safety to Management, Miners and the Union—Joint Program in the Beckley Field Brings Gains to All—Stepped-Up Safety Training Elsewhere Paves the Way to Better Records

By W. A. STANBURY JR.
Assistant Editor, Coal Age

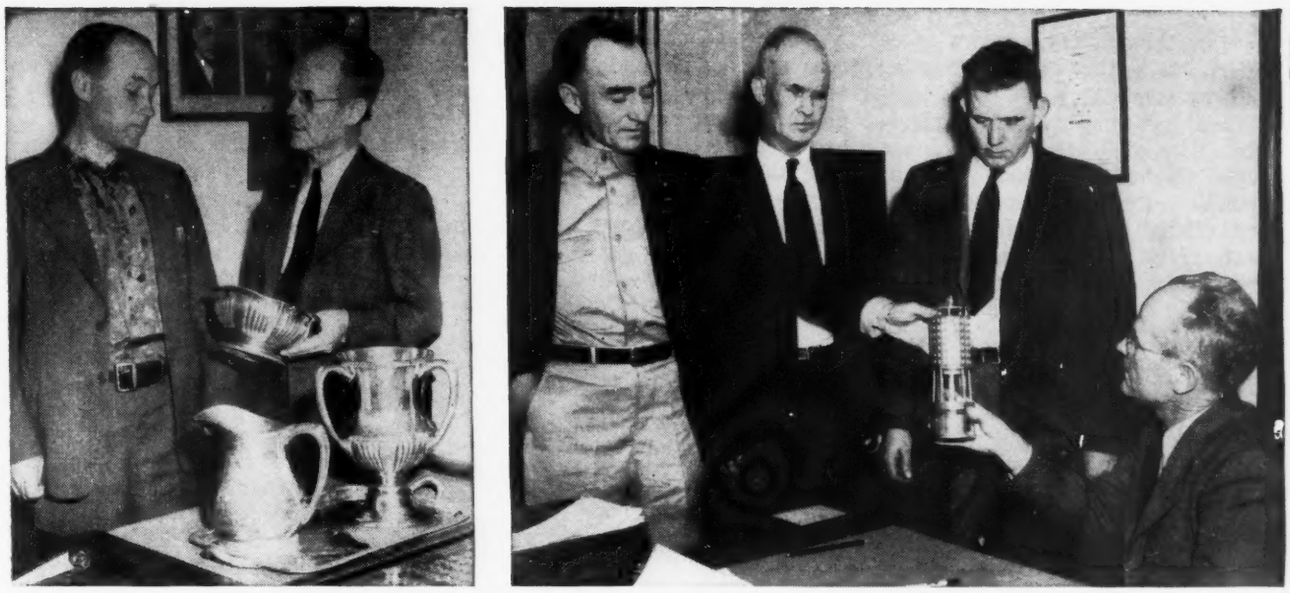
COMMITTEEMEN gather often in the safety director's office to talk about safety and find out how to improve the record by teaming up with management.

COAL-MINE SAFETY is everybody's job in and around the mine. That is why safety makes the most headway when men and management pull together to make mining safe. This kind of teamwork now is getting a firm foothold in some areas and the results so far promise gains for mine owners, miners and union officials elsewhere.

In the Beckley, W. Va., area, a joint safety campaign, enlisting the best talents of management, miners and district union officials, has marked up some impressive gains since it was started early in 1946. For instance, in the fiscal year ending June 30, 1946, only 40 coal-mining companies out of about 113 in the four fields involved, with some 210 deep mines, paid West Virginia's minimum compensation rate of $1.75 per $100 of payroll. In the fiscal year ending June 30, 1947, however, 68 companies paid the minimum rate—an increase of 28. For all companies in the area, the average compensation rate in 1945-46 was $2.85; in 1946-47, it was $2.20—a drop of 65c. Thus, on the area's monthly payroll of $14,625,000 (45,000 miners earning an average of $325 a month), compensation costs for coal operators dropped $95,062.50, or at a rate of $1,140,750 a year.

In June, 1947, a special high-powered safety effort, launched by the miners' safety council and the

Photos Courtesy Raleigh (W. Va.) Register.



TROPHIES for safety meets are displayed by C. E. Jones (holding silver bowl), safety director, U.M.W.A. District 29. Safety lamp for the best monthly paper on safety improvement goes to the winning local in each of four districts.

operators' safety committee in the New River field, produced the following results:

1946 Monthly Average	
Lost-time injuries per month	115
Average days lost per accident	42
Compensation payments per injury	$126.00
Average monthly loss of earnings by miners	$3,622.50
Average monthly loss by operators (tonnage plus compensation)	$15,697.50

June, 1947	
Lost-time injuries	49
Percent improvement	58
Net gain by miners	$2,101.05
Net gain by operators	$9,104.55

To show that still more could be done to improve the record, the safety campaigners in the New River field extended their special drive through July and marked up another 10-percent reduction in accidents, with further savings to miners and operators.

Later, in July, August and September, similar month-long campaigns with miners, operators and the union working together in the nearby Winding Gulf, Pocahontas-Tug River and Greenbrier fields, cut lost-time accidents 57, 51 and 50 percent respectively, with comparable savings to men and mine owners.

Records like these command attention. What is new about the organization behind them? What kind of thinking shaped the plan? What is the miner's share of responsibility? The operator's? The union's? How did the plan get its start?

In West Virginia, as elsewhere, the burden of safety up to 1941 and even later rested largely on the operators and state and federal safety authorities. The operators, with state and federal help, set up company safety rules, installed better equipment, sponsored safety training and safety contests and tried to get safety ideas across to the miner. The accomplishment of West Virginia operators stands in the record, which shows a drop in injuries from 121.451 per million tons in 1930 to 93.340 in 1941; fatalities, from 3.413 in 1930 to 2.093 in 1941.

Miners Push Safety

However, a major ingredient of successful safety promotion was missing—acceptance of a share of responsibility by miners and the union. As a step in a new direction, George Titler, president, U.M.W.A. District 29, Beckley, W.Va., on July 1, 1945, delegated C. E. Jones, a former state mine inspector, to study federal inspection reports on mines in that area. Mr. Jones found hazardous conditions reported in a good many mines, 65 percent of which, according to his records, were not being firebossed. In addition, a survey of accident reports from the state Department of Mines showed that safety efforts in the area needed more beef and muscle.

The outcome of these studies was the establishment, on January 16, 1946, of a Safety Department in District 29. Mr. Jones, who was named safety director, began laying plans for a cooperative safety program in the region.

Right away, the new director saw that the starting point of any successful plan had to be a new understanding between safety committeemen and local mine management and acceptance by each miner of his share of the safety responsibility. His first task, therefore, was to build mutual confidence. This he undertook by scheduling monthly safety meetings for each local union, in addition to the regular union business meetings, and inviting management representatives to take part in the discussions. On the whole, management men showed up in good numbers. By arrangement with the U. S. Bureau of Mines, a federal inspector also attended each meeting.

These monthly meetings have continued on schedule, with the spotlight always on the local safety committee. With miners, inspectors and management attending, the committee regularly reports on compliance with the Federal Mine Safety Code and on all accidents since the last safety meeting. It also leads a discussion on the cause of each accident and ways to keep similar accidents from happening again. In addition, at each meeting, safety committeemen read and explain two provisions from the safety code, two from the state mining law and two from company safety rules, adding comments on how the miner and his company stand to gain by safe work. Visiting inspectors add their ideas and individual union members are given a chance to point out how safety can be improved in and around their working places. Mine-owner representatives often throw in their ideas and sug-

gestions. The result is a lively meeting that usually draws more miners than the union's regular business meeting.

While his monthly safety meetings gathered headway, Mr. Jones backed up his invitations to management with visits to coal-company offices to talk with officials about safety, the union's plans, the need for two-way cooperation and ways of improving the unsafe conditions cited in inspectors' reports on individual mines. Mine owners had been waiting for interest like this and quickly fell in with his plans. As one operator put it, "We'll go along 100 percent with anybody who wants to help make our mines safer." They endorsed the close liaison growing between mine superintendents and responsible men in the local union. Likewise, they welcomed their own contact with the higher level of union officialdom in the interest of safety.

Schooling Safety Committeemen

Mr. Jones spent time also with local miners' safety committees, showing them what they should look for underground, telling them what their powers are under the contract and teaching them how to make their reports. In addition, he mailed to the safety committees copies of federal inspection reports on their own mines, calling attention to dangerous conditions cited by inspectors and instructing the committees to discuss the reports with local management.

To help miners carry their share of safety responsibility, Mr. Jones asked the U.S. Bureau of Mines and the state Department of Mines to give first-aid training to his miners. A course was organized in October, 1946, in each of the four coal-producing fields in District 29 and each local chose several of its members to take the course. Those who completed training were certified as first-aid instructors and passed their skills on to other miners, with the result that there are now several hundred instructors and several thousand trained miners in the district. The mine owners' share in this project was furnishing first-aid materials and meeting places for the classes.

By early 1947, the safety campaign had gained such momentum and the tasks of district headquarters had grown so big that a smaller organization was set up in each of the four fields in the district. Committeemen and officers of local unions in each field organized their own field safety councils, each with a president, a vice president, a secretary-treasurer and four committees, as follows: arrangements and finance, one representative from each local in the field; publicity, six men elected by the council; entertainment, six men elected by the council; and a special safety committee appointed by the council president to work with a committee representing mine owners.

Miners Sign Safety Pledge

Every union man who signed a pledge to work safely was declared a member of his field council and was given a membership card for his billfold. On the reverse side of his card was printed his pledge: "By accepting membership in this Safety Council, I pledge myself to promote safety at all times; to work safely myself; to cooperate with the safety committee and report all dangerous conditions observed to them; to encourage my fellow workers to work safely. I further pledge myself to take at least 15 hours of first-aid training, same to be given me by the local union first-aid instructor. Signed ....." On the front side, the following appeared: "This is to certify that ..... is a member of Safety Council No. ...., ... Field, United Mine Workers of America, and is entitled to all the rights and benefits of said council. ....., Secretary of Safety Council."

When broader powers were vested in local safety committees by the Krug-Lewis agreement of 1946 and the wage contract of 1947, it became clear that safety committeemen needed more technical training to discharge their responsibilities. In view of this need and at the request of Mr. Jones, the U.S. Bureau of Mines provided a 20-hour course in accident prevention, including the use of the flame safety lamp and the anemometer and study of the provisions of the Federal Mine Safety Code.

Safety committees now report all lost-time accidents to District 29 headquarters in Beckley. The printed form for reports provides for the following information: date, number and address of local union, name of company and mine, name of injured person and occupation, date of injury, nature of injury, whether fatal or non-fatal, number of dependents and a full description of how the accident happened.

When a fatality occurs, the safety committee goes underground with the inspectors making the investigation. When the facts are determined, the committee and district union officials publicize the accident and its cause in an effort to avoid similar accidents in the future.

With this efficient over-all organization, it was no great problem to stage special drives like the successful campaign in the New River field in June and July, 1947, which, as described earlier, cut accidents first by 58 percent and then by an additional 10 percent. To get the planning started, the field council invited mine owners to name a group to help map the drive jointly. The outcome of a series of meetings between these two groups was an agreement reading as follows:

"1. We pledge ourselves to make every effort to operate the mines during the month of June without a lost-time accident.

"2. We pledge ourselves to comply with the company safety rules, the West Virginia mining law and the Federal Mine Safety Code.

"3. It is agreed that meetings will be called by the president of each local union at each mine in the New River field at the mine before the shift enters and notify the men of the agreed plan.

"4. It is agreed that upon the arrival of the man-trip on each section, the foreman in charge will call all men together just long enough to remind them that the safety campaign is on and to BE CAREFUL.

"5. It is agreed that a safety slogan be adopted for the month of June and the word of greeting will be BE CAREFUL."

Safety Drive Launched

Sixteen safety councilmen signed this agreement in behalf of the union and 12 operators' representatives added their names. The text then was printed on placards, with companies sharing the printing costs, and posted throughout the field, with an added signed statement by President Titler and Mr. Jones urging miners to cooperate. With that, the drive was under way.

Identical agreements later were signed in the other fields—Winding Gulf, Pocahontas-Tug River and Greenbrier—by operator and union representatives to launch similar drives in July, August and September, with the results cited earlier.

Commenting on the success of these special campaigns, Mr. Jones points out that although there was nothing new in these agreements, the agreements themselves were

new in that operators and the union together agreed to do things that formerly were done independently, if at all. "There's nothing new in safety," Mr. Jones declares. "You've just got to keep on doing the same things in different ways. You've got to keep safety awareness at a high pitch and you've got to show that something's going on in safety all the time."

Competition Is Lively

To keep group interest at a high pitch and sharpen competition, a flame safety lamp is awarded monthly by each field council to the local committee that presents a paper showing the best improvement since the last meeting. One federal and one state inspector judge the contests. At the New River-field meeting Dec. 7, 1947, for example, the safety lamp was won by the committee of Local 6048, Summerlee mine, The New River Co. Adding interest to this meeting, A. J. Alexander, chief, West Virginia Department of Mines, made a speech pledging a campaign to reduce haulage accidents. "It was a stomp-down good meeting," Mr. Jones reported.

"One group alone—either management or the union—can't make the mines safe," Mr. Jones contends. "We've got to do it together." On the miners' side, he points out, the union itself takes on a large share of the costs of promoting safety. Purchase of the prize safety lamps, as well as other safety-council expenses, is financed by a contribution of 1c. per miner per month by locals in each field. In addition, each local pays its safety committeemen for making inspections, investigations, etc. All together, Mr. Jones estimates that District 29 and its locals pay out as much as $15,000 a month on safety. Also, when an inspector's report shows improved safety conditions in a mine, as compared with a prior report, Mr. Jones writes a friendly, complimentary letter to the manager or superintendent or makes a personal visit to the company's office to express his compliments.

On their side, the operators, besides improving their equipment to make mining safer, give strong moral backing to the safety movement and are looking for new ways to work side by side with miners and their union. Two operators in the district, when asked about the safety campaign, cited the improving safety record and the noticeable change in the union's attitude toward safety. In this last connection, they pointed out that the union now backs up management when men are penalized or discharged for safety violations. A third operator declared, "Mr. Jones is a sincere, earnest union official. He can't bring about any overnight miracles nor can anybody else alone, but the forces that make for safety are better coordinated in this area than ever before."

Elsewhere in the nation, as well as near Beckley, mine workers and the union are strengthening their efforts for safety, always with the encouragement if not the active participation of management. For example, William Blizzard, president, District 17, U.M.W.A., launched a safety-training program for safety committeemen in November, 1947, with a big rally at Seth, W. Va. In Colorado, it was announced in January, 1948, that 146 out of 152 employees at the Colorado Fuel & Iron Co.'s Kebler mine and 42 out of 60 workers at the Pictou mine had completed a 15-hour first-aid course taught by men from the U.S. Bureau of Mines. The miners studied treatment for burns, dislocations, fractures, fainting, heat exhaustion, bleeding and open wounds. Earlier, in December, members of the U.M.W.A. safety committees in southern Illinois stated publicly that mine owners in that region were cooperating fully in improving safety for workers.

On a nation-wide basis, according to the U.M.W.A. *Journal* of Jan. 15, 1948, Bureau-sponsored first-aid training for safety committeemen at the end of 1947 added up to 2,031 men who had completed the course and 662 who still were under instruction. Out of 490,000 miners in anthracite and bituminous, a total of 2,693 trained in first aid seems small. It should be remembered, however, that the program has been under way only a year. It can be counted on to gain momentum and mine safety committeemen can be expected to spread the gospel among their fellow workers and thus multiply the benefits of the course.

Organizing for Teamwork

Meanwhile, there is much to be learned by miners, management and union officials from the safety program that is producing such gains near Beckley, W.Va. Some of these lessons are:

1. Self-interest, propagandized by both sides—miners and mine owner—provides a motive for safety. Greater safety, it is pointed out to operators, means fewer production interruptions, savings in compensation and insurance rates, closer and friendlier relations with workers and better morale among miners. For miners, improved safety means less lost time and fatter pay envelopes, as well as good health and long life.

2. Group interest also adds punch to safety promotion. For operators, improving the record means better public relations for the company and the industry. On the miners' side, it builds prestige for their union as an enlightened labor group. For both, safety conferences open the way to better understanding of the larger problems on both sides and thus to a better understanding of each other.

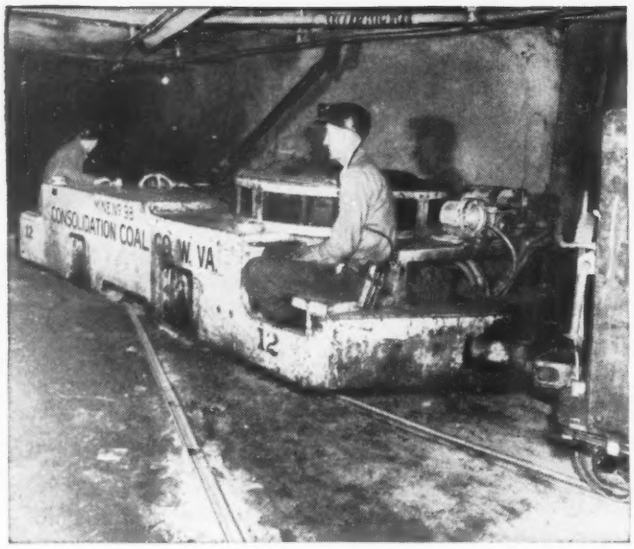
Miners Share Responsibility

3. Giving the miner some authority and responsibility for safety is getting results. Picked out to teach safety to his fellow miners, a safety committeeman has to stay on his toes to keep their respect. Likewise, the men he teaches accept direction from him more willingly than they would from an outsider or a superior. In addition, the responsibility for investigating accidents, reporting the facts and recommending corrections is a sobering influence. Few if any safety committees have abused their authority to close down a mine. In fact, their frequent conferences with mine officials on local conditions have showed them that management's methods have some merit and that hasty action often produces poor results.

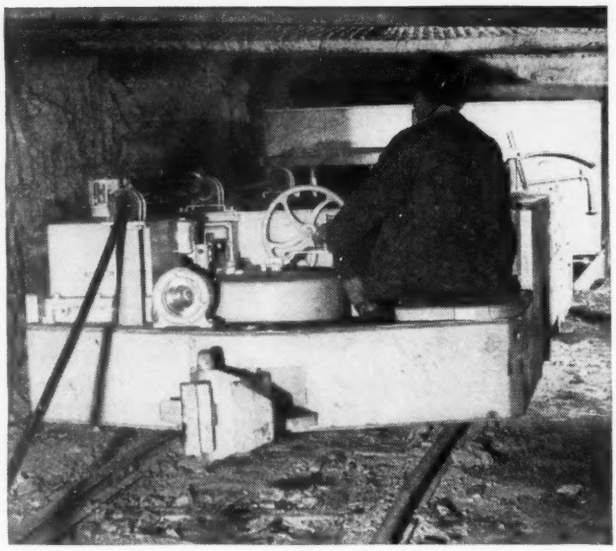
4. Use of safety-training helps from state and federal agencies lends authority to the program and assures top-flight teaching by experts whose business is safety.

5. By stressing safety all the time, mine owners and the union are making workers safety-conscious as well as tonnage-conscious. Monthly safety meetings, contests, awards, posters, special drives, first-aid meets—all these give variety to safety promotion and show miners that something is going on all the time to make mines safer.

6. Quick action by management and the union to correct unsafe conditions, strict enforcement of rules by supervisors, with the union backing them up, and division of promotional and training costs between the company and the union show the miner that both owners and the union mean business about safety.



HEADING BACK from the main bottom with empties. Maximum speed on the trolley is 7.8 m.p.h. with rated drawbar pull; proportionately greater with lighter loads.



OPERATING ON THE REEL, the two series fields are not shunted and the maximum speed at rated drawbar pull is 5.6 m.p.h. A single-handle controller promotes safety and speed of handling.

Dual-Duty Locomotives at Consol

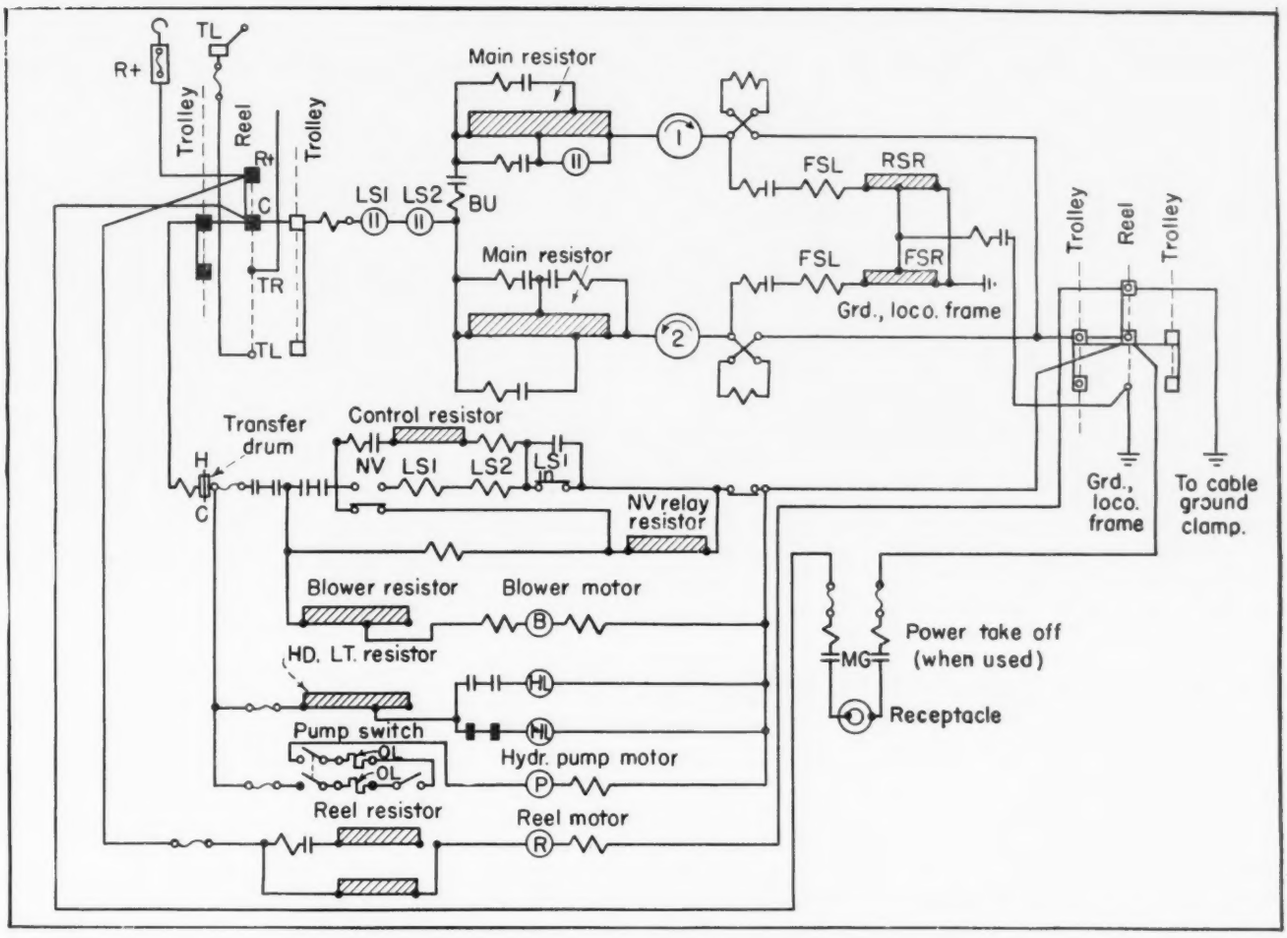
Handling 11-Ton Cars in Rehabilitated Mine, New Locomotives Are Designed With Two Speed Ranges for Gathering and Trolley Work—Change Made by Shunting Series Fields—Motors Permanently in Parallel

NO. 98 OFFICIALS—Standing (left), Arley Haines, maintenance foreman; O. F. Allen, mine foreman; R. D. Patterson, superintendent; Paul Hay, section foreman; and Edgar Heldreth, section foreman; kneeling (left), W. H. Weaver, outside foreman; E. L. Zuspan, night foreman; and Baxter Weimer, section foreman.

OPERATING and maintenance men report good service and efficient performance as a result of some two years' experience with new-type dual-duty gathering locomotives at No. 98 mine, Consolidation Coal Co. (W. Va.), Nora, W. Va. These cable-reel locomotives, with motors permanently connected in parallel, provide one range of speeds for servicing 11-ton mine cars to track-mounted loading machines and a higher range for travelling with trolley power. Incorporated in the design are several features for handling greater tonnage, promoting safety, using power efficiently and reducing maintenance cost.

When taken over by Consolidation, No. 98 mine, in the Pittsburgh seam, was an old shaft operation that had produced but a small tonnage and had been down a number of years. In modernizing, a rock slope was sunk and equipped with a belt conveyor and a rotary dump was installed underground. Eleven-ton eight-wheeled mine cars and track-mounted cutters also were adopted. Development of the mains is still under way, and the headings now extend 4,300 ft. from the slope bottom.

The new gathering locomotives, developed and built by Westinghouse, are four-wheeled two-motor units with the two 250-volt d.c. motors hung inside the axles. Nominal rating is 8 tons and the rated



CONTROL AND MOTOR CONNECTIONS for dual-duty gathering locomotive.

drawbar pull is 4,000 lb. Wheel gage is 42 in., the motors are Type 95OT, rated at 50 hp. 470 r.p.m. 172 amp. Single-reduction gearing is used. Frames, made of heavy steel plate, are outside the wheels and the bumpers are equipped with Willison automatic couplers. Speeds from creep to 5.6 m.p.h. are provided on cable reel and from creep to 7.8 m.p.h. on trolley.

To obtain the higher motor speed for trolley operation, some of the current is shunted from the series fields by appropriate resistances of very low ohmic value. The controller is of the single-handle type and moving the handle counterclockwise from "Off" results in forward motion; clockwise, the reverse. As the main drum, actuated directly by the handle, is moved either way from "Off" toward the first point, it moves a reverse drum to set up the proper motor connections.

As the controller handle is advanced to the fifth notch, cam-operated main switches cut out the accelerating resistance in steps. At the fifth notch the motors are across the line. When operating on the cable reel, the fifth notch is the limit. With power through the trolley pole, the handle can be advanced to Notches 6 and 7, which weaken the fields by connecting shunts across them.

Line switches with overload and no-voltage relays are operated from control cam switches on the main drum of the controller. Protection in "bucking" consists of the overload relays and a resistance in the motor-loop circuit. The motor can be "bucked" for breaking as long as the controller is advanced no farther than the first point. On the second point, the reversed overload kicks out the relays. The current-limiting resistance is brought into play by a contactor connected across one section of one of the motor-accelerating resistors.

The locomotives have explosion-tested equipment. The gearless cable reel is of the dual-torque type. The motors are not ventilated but the controller and contactor box are—by one blower with branching air duct. Resistors are Type M edgewound. Armature and field coils are insulated with a new varnish designed for high temperatures. Leads into the resistor box are Silicone-treated to withstand the high temperatures and protect the insulation from the damaging effects of moisture.

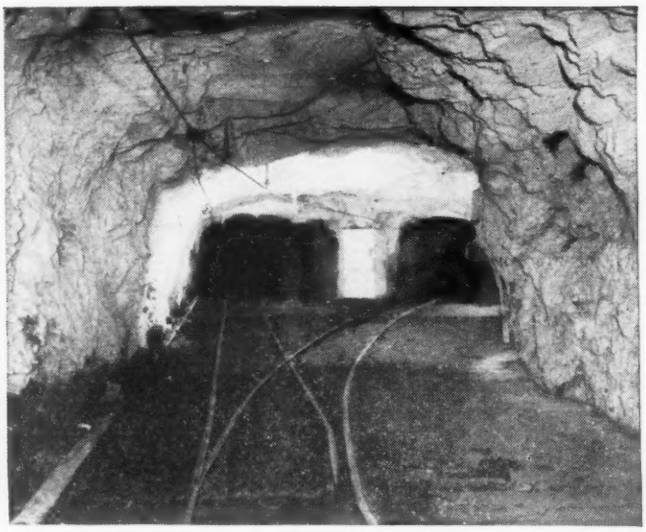
Hydraulic service brakes include an accumulator that permits making at least three brake applications after a power failure. The manual screw-operated parking brakes also can be used as service brakes. Valves for the four sand boxes are hydraulically operated.

Wheels are rolled steel, axles are 4¼ in. in diameter and the axles and journals are equipped with roller bearings. Renewable wearing plates are attached to the frames and to the journal boxes. Covers of journal boxes are screw type. Frames are hung on semi-elliptical leaf springs and for each truck there is a separate cross equalizer. Face width of the gears is 4 in. The single-reduction ratio is 13:69.

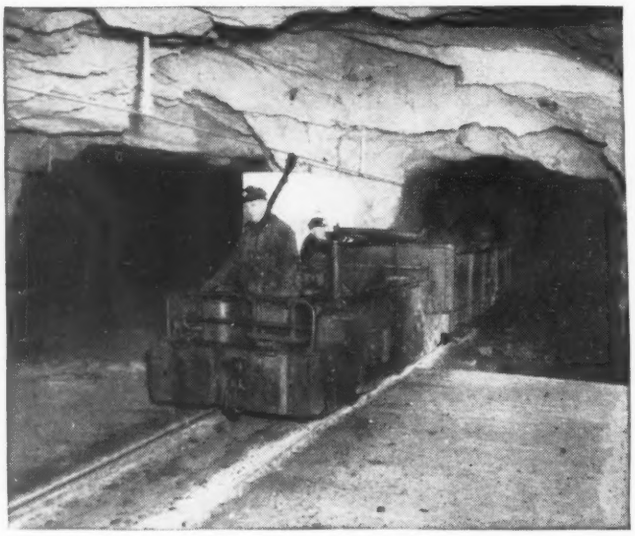
Asked what he thought about "bucking" where more than one point trips the overload, a motorman on one of the locomotives said: "It's all right. You soon learn to buck it only to the first notch." In addition, he declared that the locomotives "sure can pull and they stay on the track and don't gallop." Actual weight of the locomotive with full equipment is 23,800 lb.

PINE KNOT TUNNEL AND TRANSPORTATION PRACTICE

PINE KNOT NO. 2 SHAFT, presently used as a man shaft, will eventually handle supplies and coal.

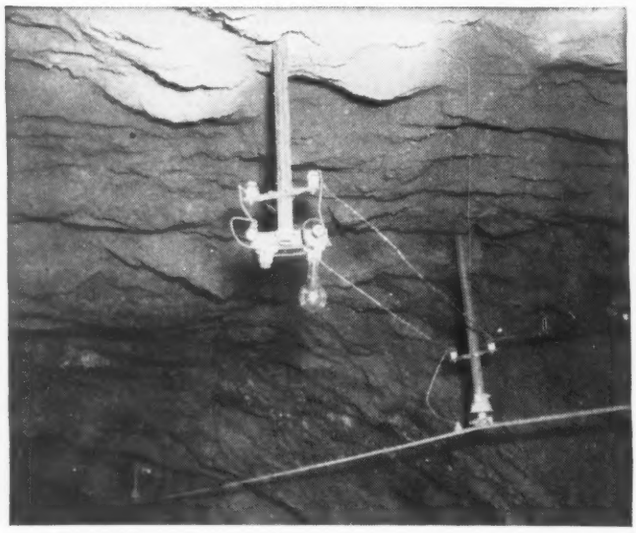


THE MAIN ROCK TUNNEL has a branch tunnel (right) which serves the Pine Knot No. 2 shaft



THE MAIN-LINE LOCOMOTIVE uses dynamic braking while descending the 2.3 percent grade in the branch tunnel. George Martin, motorman, and John Plunket, nipper, haul all the coal through the main tunnel to Oak Hill breaker.

LITTLE BUCK HAULAGE GANGWAY, where the two contractors "holed" together in line and to grade. Two timbering methods were used in this gangway: (1) post and bar with rib-pin anchors and (2) bar with two posts.



FUSE-PROTECTED LAMPS used in the tunnels and gangways are safer. Both men and equipment are protected.

LEFT TO RIGHT: Thomas Snyder and Joseph Walker, mine foreman and assistant, respectively, Pine Knot No. 2 shaft.

THE OAK HILL BREAKER prepares coal from both underground operations and stripping jobs, including the Beechwood pit.

Tunnels Reopen Old Sections

Pumping Head Reduced 178 Ft. and Natural Drainage Facilitated in Reopening Two P. & R. Working Sections by Tunnel System—Lamps on Haulageways Fused—Special Controls Improve Hoist Operation

By R. R. RICHART

Associate Editor, Coal Age

DRIVING APPROXIMATELY one mile of rock tunnel across the Mine Hill anticline made possible the elimination of 178 ft. of pumping head at the Pine Knot shaft of the Philadelphia & Reading Coal & Iron Co., Minersville, Schulkill County, Pa. During the first 10 months of 1947, 2,190 g.p.m. was pumped at the reduced head and, in addition, an estimated 5,000 g.p.m. from the

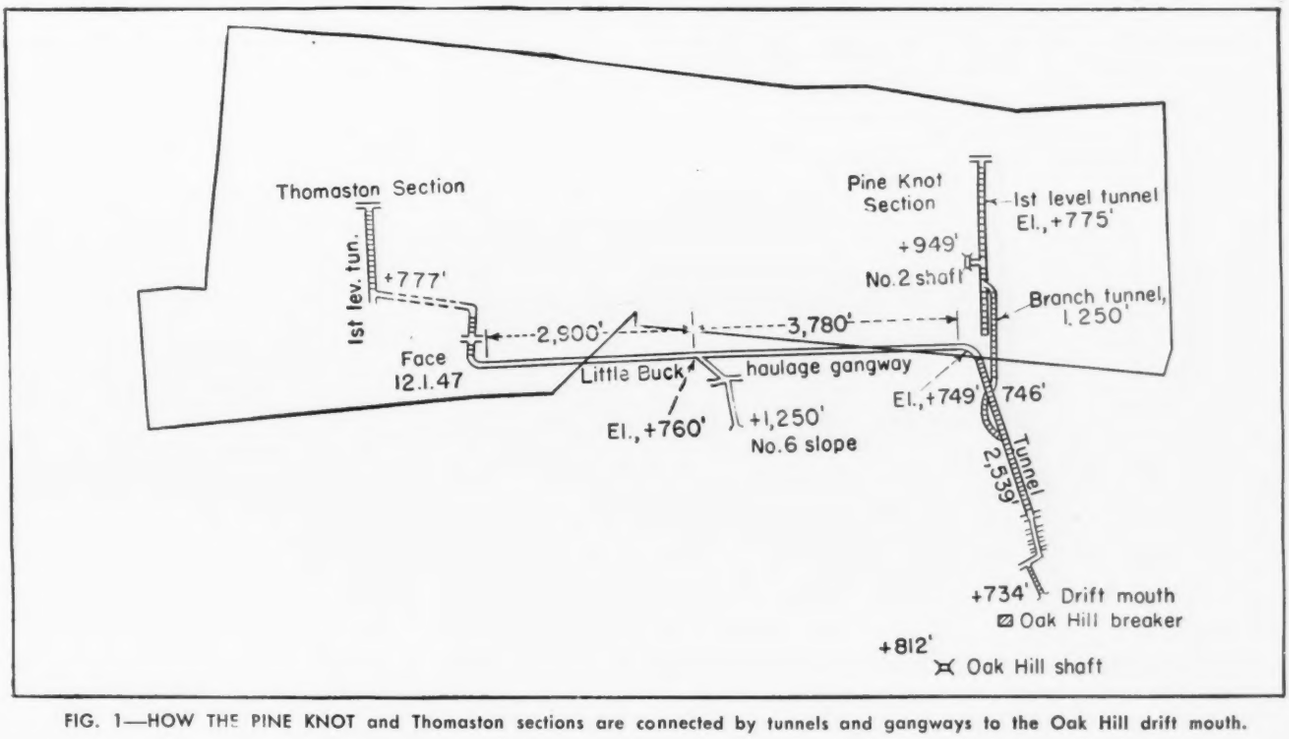


FIG. 1—HOW THE PINE KNOT and Thomaston sections are connected by tunnels and gangways to the Oak Hill drift mouth.

TUNNEL LOCATION AND CONSTRUCTION AT PINE KNOT

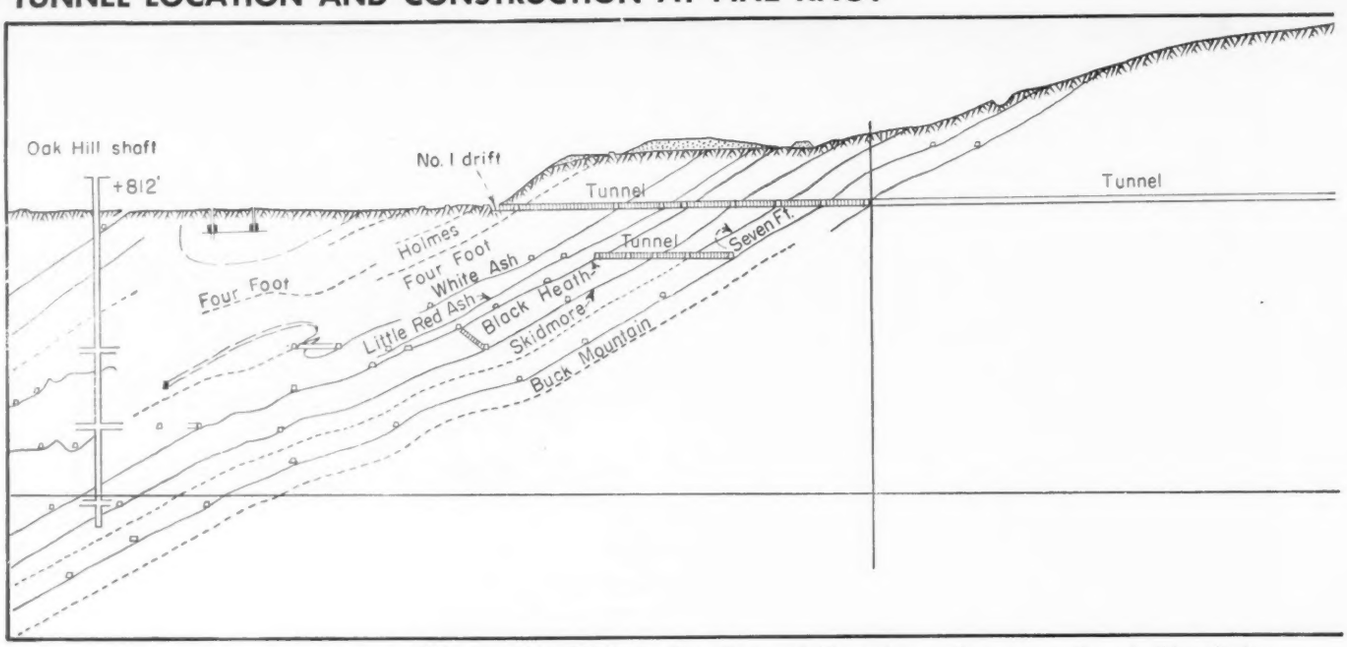


FIG. 2—COAL FROM the Pine Knot and Thomaston sections moves through this mile-long

TWO METHODS OF TIMBERING used in one section of the Little Buck haulage gangway.

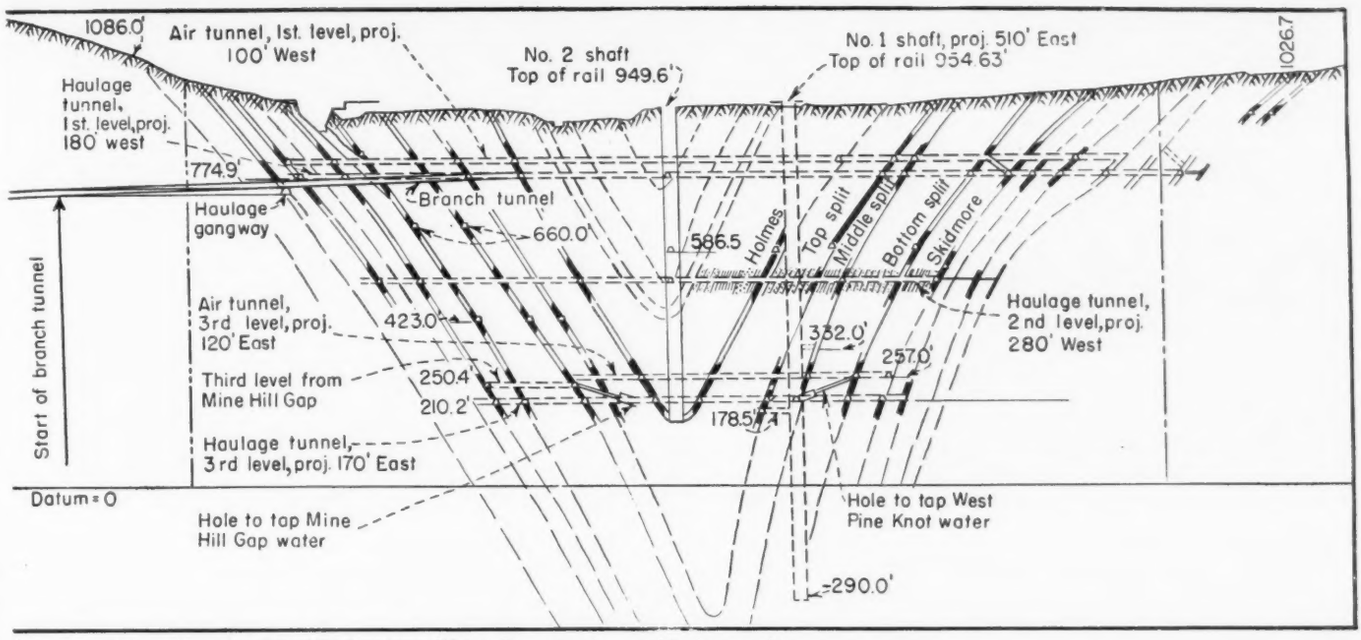
Thomaston section was diverted to the surface by gravity.

The new tunnel system was planned and developed to permit the reopening of the Pine Knot and Thomaston sections to augment the present output and eventually supplant entirely the production of the Oak Hill section, which extends to the 6th Level (200 ft. below sea level) and which was rapidly being exhausted. Coal reaches the Oak Hill breaker by way of the main tunnel.

Mechanical Equipment Used

Much of the 8x14-ft. tunnel and 3x5ft. drainage ditch, driven through the "Pottsville Conglomerate," was double-shifted with mechanical equipment at a rate of 14 to 16 ft. a day. Two rock contractors completed the 11,569-ft. tunnel and gangway system, which included enlarging a 1,100-ft. combination tunnel-and-gangway run from 7x12 to 8x14 ft., in about three years.

Starting at the drift mouth near the Oak Hill breaker, improvements were made in the tunnel system (Fig. 1) as follows: An old 1,100-ft. run, part of which lies in the Red Ash vein, was enlarged from 7x12 to 8x14, ft. and a 3x5-ft. ditch excavated. Beyond this section, a completely new 2,539-ft.-long rock tunnel, also 8x14 ft. with a 3x5-ft. drainage ditch, was constructed, along with a 450-ft.-long passing-track tunnel. Near the inby end of the passing-track tunnel a 1,250-ft. tunnel branches to the right and connects with the Pine Knot No. 2



rock tunnel to the Oak Hill breaker. Water flows to the outside by gravity.

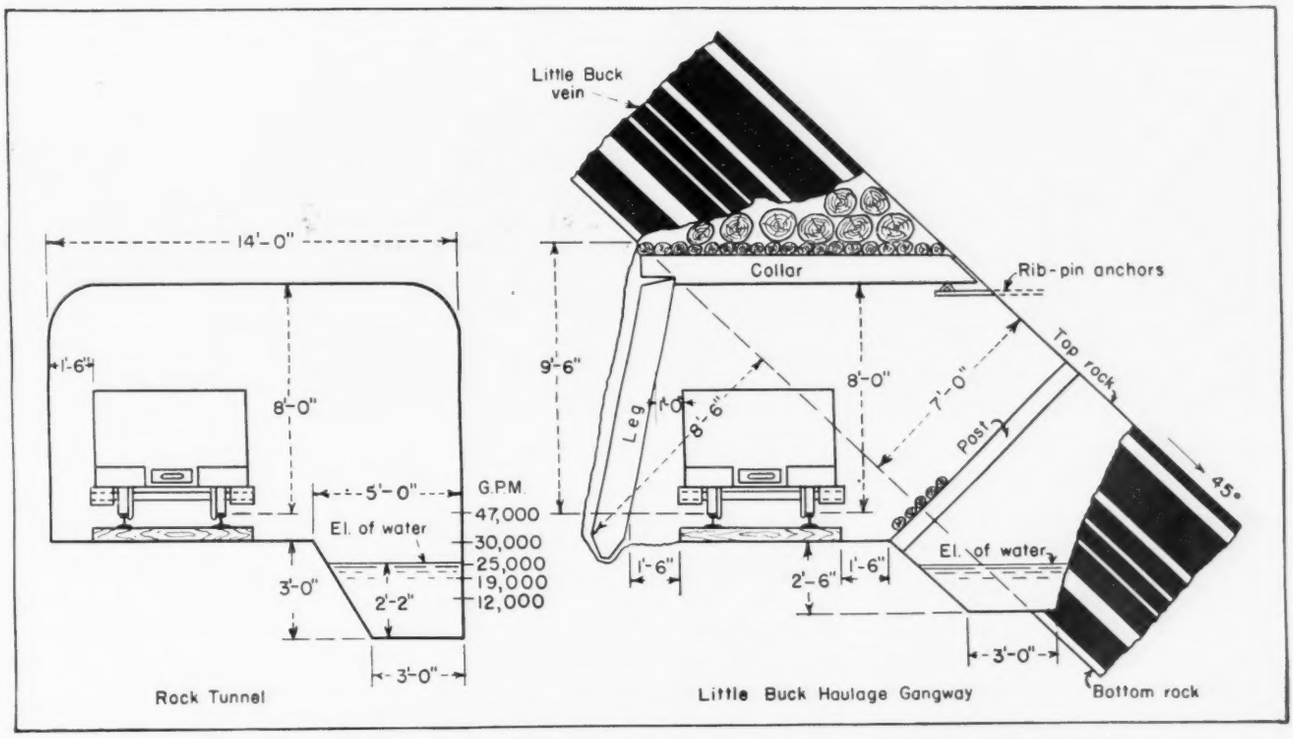


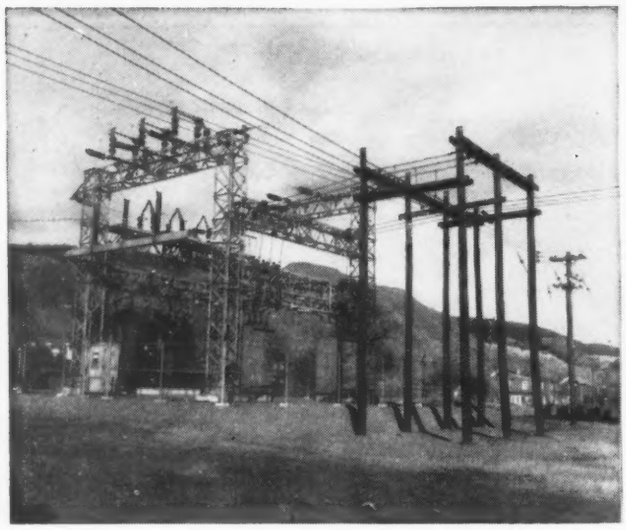
FIG. 3—CROSS-SECTION of rock tunnel and gangway showing the location of the drainage ditch.

shaft. The main rock tunnel continues straight until it intersects the Little Buck vein on the north dip of the Mine Hill anticline. Completing the tunnel and gangway system is a 6,680-ft. haulage gangway in the Little Buck vein to the Thomaston section.

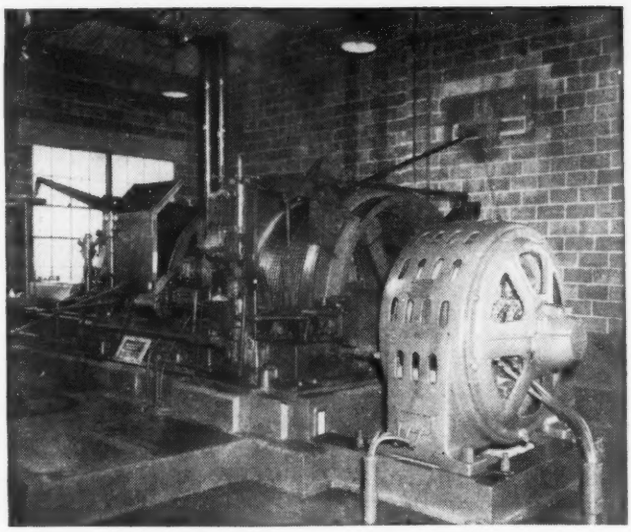
Gradient of the tunnel and gangway system was limited to a drop of 43 ft. in 10,319 to permit drainage by gravity from the Thomaston section to the drift mouth near the Oak Hill colliery. This is an average gradient of less than 0.5 percent. The original grade in the old 1,100-ft. section varied from 0.5 to 1.0 percent. To make up for this "extravagant" use of drainage head, the grade of the 2,539-ft. rock tunnel was set at 0.2788 percent. Flow with a full ditch of water, even at this gradient, totals to 30,000 g.p.m.

While the low over-all drainage gradient favored the Thomaston section it necessitated driving the 1,250-ft. branch tunnel on a 2.328 percent grade. The 12-ton General Electric locomotive installed uses dynamic braking to regulate the speed of the loaded trips while descending this grade.

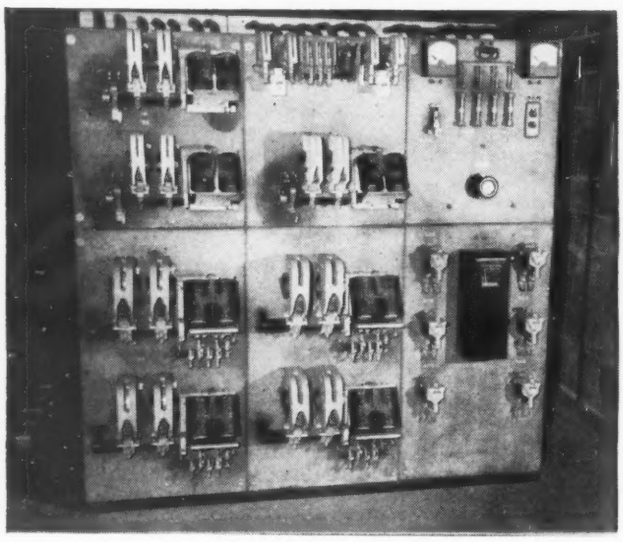
An 8-ft. tunnel height (Fig. 3) was chosen to permit more efficient operation of the mechanical mucking equipment. John Marks, Minersville rock contractor, started the main tunnel operation with a used 36-in.-gage electric mucking unit, and later changed to an air-operated Eimco Rock Shovel. Drilling equipment consisted of three Type DA



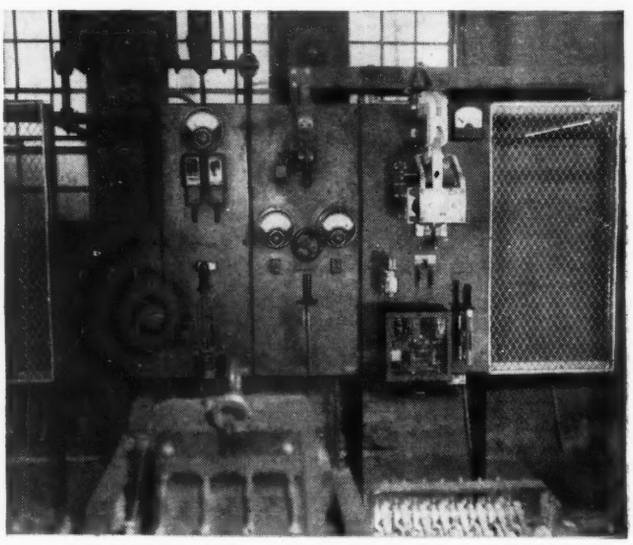
COLLIERY TRANSFORMERS are located in the Philadelphia & Reading substation inclosure.



THE DOUBLE cylindrical-drum hoist driven by a 600-hp. 2,200-volt slipring induction motor serving Pine Knot No. 2 shaft.



SEVEN D.C.-OPERATED contactors are used to accelerate the 600-hp. slipring induction hoist motor.



ROTARY CONVERTER SWITCHBOARD modernized by d.c.-reclosing relays and magnetic contactor (righthand panel).

GABRIEL KROBATH, hoisting engineer, examines overcurrent relays on 2,300-volt panel.

CYRUS KUNISKY, night section foreman, Pine Knot No. 2 shaft.

4-in. Chicago Pneumatic drifters equipped with Timken bits and mounted on a Cleveland Model 1MDR drill carriage. An 18-in. steel pipeline carried air to the working face. Compressed air was piped in a 4-in. main with a 2-in. service line at the face.

On single-shift work, a four-man drilling crew drilled and shot a round of 30 holes to pull 7 to 8 ft. of rock. Holes were loaded with eight to twelve 1¼x8-in. sticks of American Cyanamid straight- or semi-gelatin explosive. A three-man mucking crew mucked-out the fall and extended the track in one shift. Sometimes the drainage ditch was mucked by hand. At other times, a scraper was used to drag the broken rock into piles for final loading by the mucking machine.

On double-shift work, the advance netted 14 to 16 ft. per day.

As many as 35 to 40 cars of rock were mucked in 24 hours. When the tunnel had been advanced 1,000 ft. a Canton car-transfer table was used to facilitate servicing the mucking machine.

Two additional working faces for stepping-up the progress of the over-all project were started in the Little Buck vein in the vicinity of the No. 6 slope (near the Thomaston section) by Hugh Dolan & Son, the other rock contractor. This contractor drove west 2,900 ft. to the edge of the Thomaston section, then east from the No. 6 slope 2,230 ft. to meet John Marks, who, after completing the main rock tunnel, turned left and drove the Little Buck haulage gangway 1,550 ft. west. The gangway work included rock and coal work, plus considerable timbering.

Work Kept to Schedule

The consistent rate at which both the tunnels and gangway were advanced was attributed to the fact that in contract work the crew always arranges to complete the work scheduled for the shift. The crew might be short-handed but, nevertheless, those crew members present see that the full cut is taken on that shift. Being able to depend on this regularity of advance meant a great deal in planning for the future at Oak Hill and the meeting of coal commitments from that colliery.

Water in the Thomaston section was tapped through test holes from the Little Buck haulage gangway. One 1½-in. test hole was drilled through the 136-ft. barrier pillar and later a 9¾-in. hole was drilled to speed up the dewatering job.

Dewatering operations to permit the reconditioning of the Pine Knot No. 2 shaft were started in the fall of 1941. Three 4,000-g.p.m. centrifugal pumps, belonging to the Commonwealth of Pennsylvania and purchased to dewater collieries after the 1938 flood, were installed on a platform in the shaft. Two of these units are still operating from a temporary platform below the No. 1 level. They maintain the sump level at 90 ft. below the first, or branch-tunnel, level to reduce the water pressure on the adjoining lessee operations. The water is discharged into the drainage ditch in the branch tunnel at the No. 1 level, eliminating a 178-ft. pumping head. Controls for the 400-h.p. 2,300-volt pump motors are housed on the surface between the new hoist house and the shaft headframe.

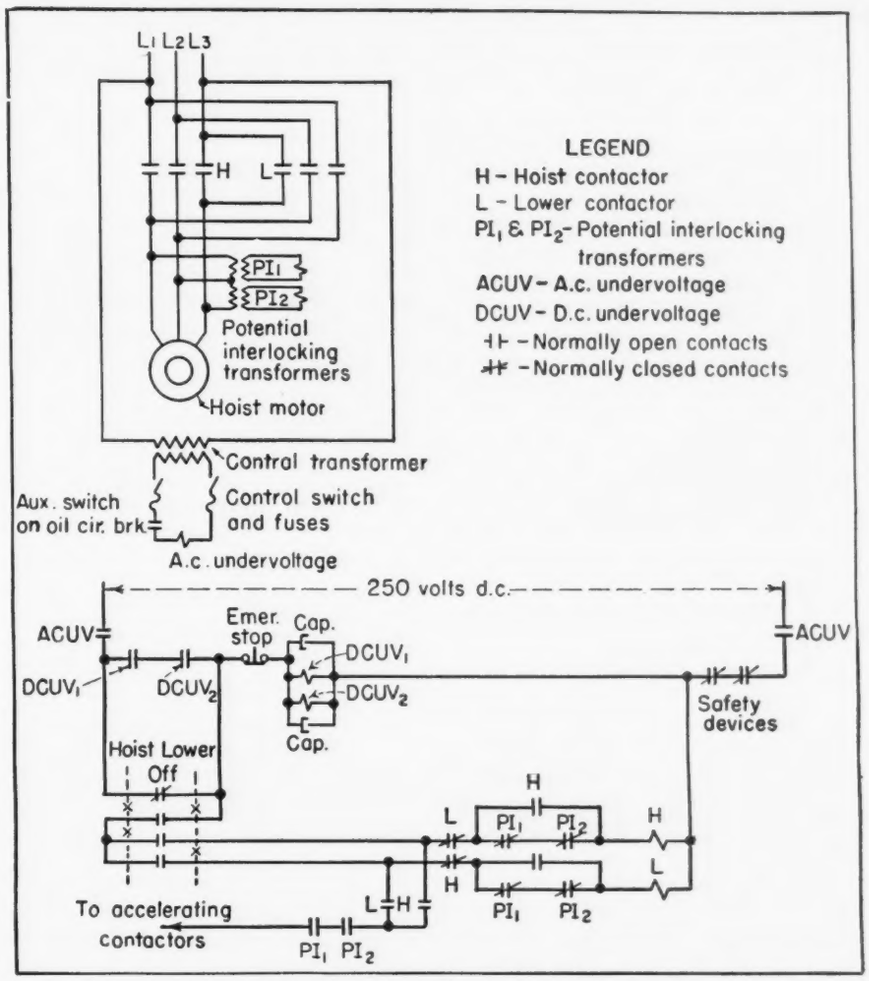


FIG. 4—HOW THE potential interlocking circuit prevents the closing of both the hoisting and lowering contractors at the same time.

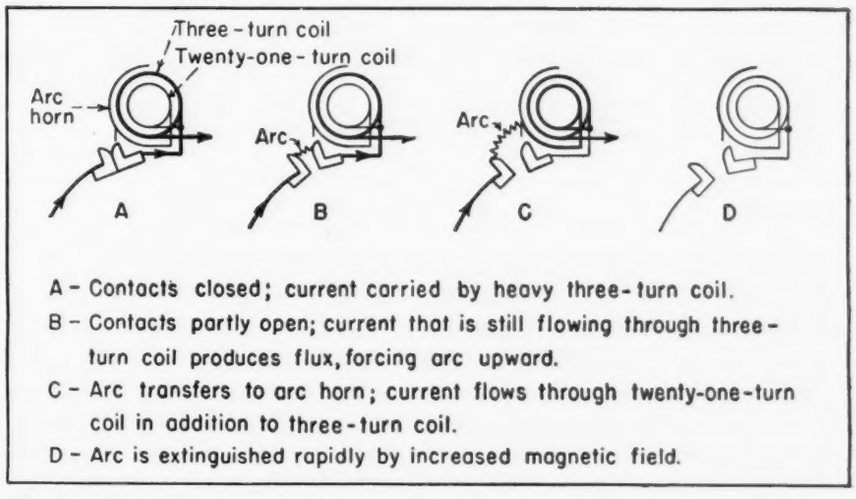

Three-turn coil
Twenty-one-turn coil
Arc horn
Arc
A
B
C
D
A – Contacts closed; current carried by heavy three-turn coil.
B – Contacts partly open; current that is still flowing through three-turn coil produces flux, forcing arc upward.
C – Arc transfers to arc horn; current flows through twenty-one-turn coil in addition to three-turn coil.
D – Arc is extinguished rapidly by increased magnetic field.

FIG. 5—TWO-SECTION magnetic-blowout coils help extinguish arcing at the 2,300-volt contactors in the hoist-control system.

Two sets of Canton automatic doors for 550-ft.-long haulage airlocks on the No. 1 level were being installed as ventilation improvements when the material for this article was being gathered. One set will serve in the Little Buck haulage gangway, and the other will be located beyond the Pine Knot No. 2 shaft, also installed on No. 1 level.

The combination fuse-and-lamp installation used in illuminating the rock tunnels and gangways is a safety improvement. Replacing lamps in live lamp sockets, whether the porcelain or waterproof-type, is definitely a hazard.

An arc may be started in the

socket which, under the right conditions, may fan out and establish itself across the gap between the current-carrying parts of the socket. Normally, with no lamp in the socket, the gap resistance approaches infinity. With a lamp in the socket, the gap resistance is lowered to that of the lamp's filament. If an arc is established between the current-carrying contacts of the socket a short circuit results, the value of the short-circuit current being limited by the resistance of the arc. In all probability, the socket will be destroyed before the arc can be extinguished or a lead to the socket will be burned in two. The extra heat imparted to an already hot lamp base may cause the lamp to explode. The larger the lamp, the heavier the current for establishing the arc.

Arcing is worse when lamps are operated from a d.c. circuit. Because of the steady-state conditions of a d.c. power circuit, arcing is worse than under similar conditions on an a.c. circuit.

The installation of a 3-amp. plug-type fuse on the "hot," or line, side of the lamp socket is protection for a man replacing a lamp, and also protection for the lamp and the socket. By loosening or unscrewing the fuse, the circuit to the lamp socket is de-energized, and the lamp may be replaced in safety. Furthermore, the fuse will blow before a heavy short circuit can be established, thus protecting the lamp, socket and wiring.

Hoist to Handle Coal

The double cylindrical-drum Vulcan hoist driven by a 600-hp. 2,200-volt General Electric slipring motor at Pine Knot No. 2 shaft is, at present, used only as a man hoist. Eventually, it also will handle supplies and hoist coal between the branch tunnel (first level) and the second and third levels. Safety and control features of the hoist include overwind limit switches, Lilly controller, brake solenoid and brake-wear limit switches to prevent overwind and overspeed of the cages.

On the 2,300-volt circuit, a Type FK-143 600-amp. 7,500-volt oil circuit breaker with a 50,000 kva. interrupting capacity provides fault interruption, serves as a disconnecting switch and provides back-up protection in the event of an overwind. The selection of the proper interrupting capacity for such a breaker is governed by the available short-circuit current of the utility system rather than by the rating of the hoist motor. However, such a breaker also must have a high interrupting rating for the sake of the contactors in the rotor, or secondary, circuit of the motor, which have an interrupting capacity of about ten times their normal current rating.

Potential interlocking (Fig. 4), a protective feature incorporated in the air-break high-voltage reversing-contactor equipment, prevents the closing of the hoist and lower contactors simultaneously. Of course, the simplest way to reverse a three-phase motor is to reverse any two of the three main power leads, and that is what the reversing contactors do. However, only one group of contacts can be closed at a time. Otherwise a solid phase-to-phase short would be applied to the 2,300-volt power supply.

Protection against this type of a short circuit is obtained by connecting two potential transformers in open-delta across the primary leads to the motor, with an interlocking relay wired in the secondary of each potential transformer. The normally-closed contacts of the potential interlocking relays remain open as long as there is voltage between any two of the primary leads to the motor. The relay contacts are wired in the coil circuits of the hoist and lower reversing contactors. Thus, if the hoist has been operating in one direction, it cannot be reversed and operated in the opposite direction until all arcs at the 2,300-volt contacts have been extinguished and the potential interlocking relays have dropped out. This prevents the possibility of a short on the 2,300-volt system through too-rapid operation of the air-break high-voltage reversing contactors.

In starting the motor, as soon as either the hoist or lower reversing contactor coil is energized, an auxiliary contact seals around the contacts of the potential-interlocking relays before they open. In fact, there is a slight delay because these relays are not energized until the air-break high-voltage reversing contactor closes to energize the hoist motor.

The two-section magnetic-blowout coils (Fig. 5) help to do a better job of extinguishing the arcs at the 2,300-volt contactors. Each contactor pole, according to General Electric, manufacturer of the control equipment, is fitted with a two-section blowout coil that provides a continuous blowout field for forcing the arc off the contacts onto the arcing horns. Here, the auxiliary blowout field forces the arc into the restricted section of the arc chute where it is extinguished by stretching and cooling.

All the primary and secondary control equipment is housed in a room separate from the hoist. Arcing and contactor noises are thus muffled and the hoisting engineer has a better chance of hearing his signals. The cast-grid multi-tier frame resistors are located behind the contactor panels in the control room, where the heat is permitted to escape through louvers to the outside air.

Eight Accelerating Steps

This 600-hp. hoist has eight accelerating steps, which means that there are seven accelerating contactors for shorting out successively the resistor steps in the rotor circuit. Each contactor is actuated by the twin-coil d.c. electro-magnets recommended for use with motors larger than 450 hp. and for hoists on fast-duty cycles. Full voltage is applied to the d.c.-magnet coils to close the two-pole contactors. When the magnet has nearly sealed, a normally-closed interlock inserts resistance in series with the coils and reduces the coil current to prevent overheating of the coils. Advantages of the d.c. contactors over those of the conventional design are reported to be: (1) longer mechanical life; (2) quieter operation —less hammer-blow in closing and the absence of a.c. hum; and (3) less coil current needed—therefore, reduced duty on control contacts.

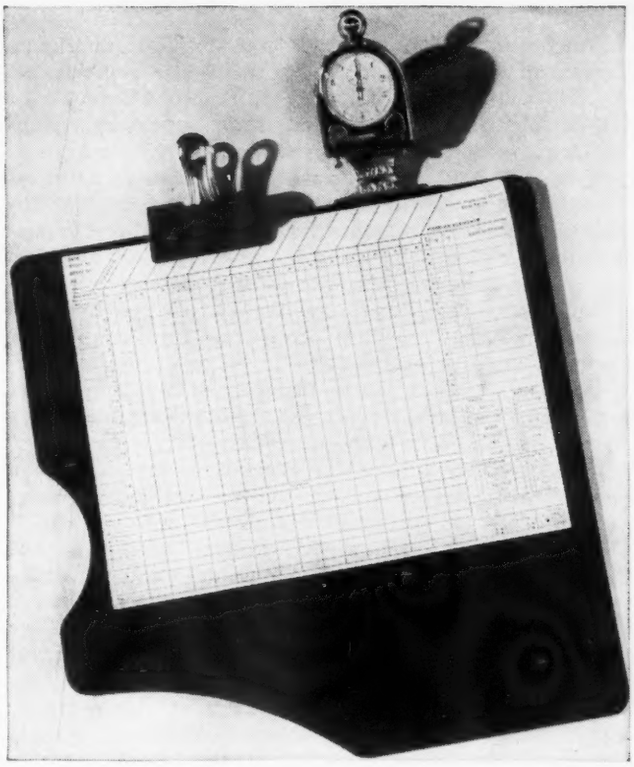
P. & R. Operating Personnel

POTTSVILLE OFFICE

R. E. Taggart, president
George A. Roos, vice president in charge of operations
Edward G. Fox, general manager
Edward A. Lynch, director of personnel
D. E. Ingersoll, division superintendent
William C. Muehlhof, chief engineer
Harry A. Leidich, safety engineer
Albert Brown, electrical engineer;
Elmer F. Young, mining engineer
Charles E. Brown, stripping engineer
John B. Hicks, transportation engineer
H. R. Hagen, mechanical engineer.

OAK HILL COLLIERY

D. L. Freiler, superintendent
R. T. Jones, assistant superintendent
A. Antonio, colliery clerk
Carl Deiter, chief electrician
F. I. Gilmartin, general outside foreman
L. F. Brady, mine foreman
Thomas Snyder, mine foreman
L. Stroup, breaker foreman
Milton Hale, safety engineer.



Courtesy Meylan Stopwatch Co., New York.

FIG. 1—TIME-STUDY TOOLS—decimal-minute stop watch and late-type board for holding record sheets.

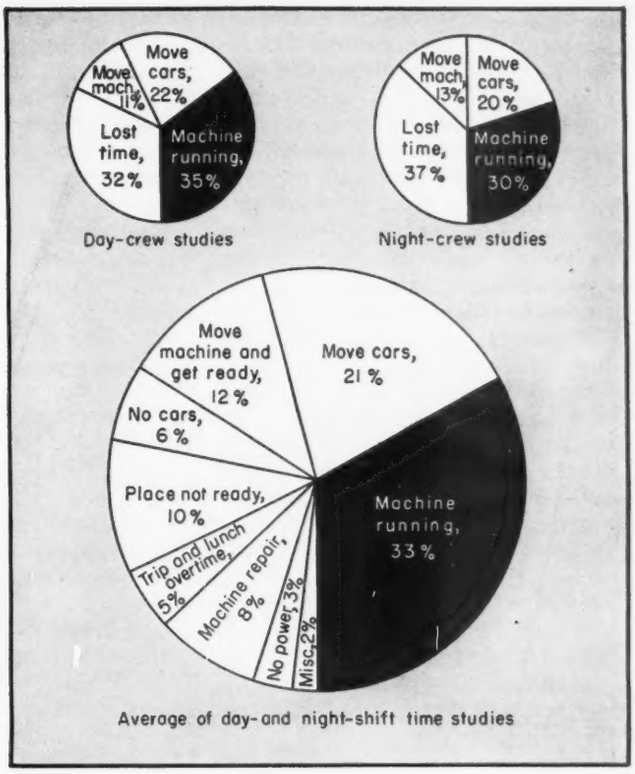


FIG. 2—SUMMARY OF LOADING-MACHINE time utilization before application of modern managerial principles.

Efficiency Through Time Study

What Time Study Is—How It Shows Delays and Production Losses—How Time Studies Are Made—How to Work up the Data—Use of the Data in Revising Operating Methods and Setting Production Standards

By VICTOR C. STEPHENS

Supervising Engineer, Singleton-Hartwell, Inc., New York

TIME STUDY is a way of discovering delays and determining their relative importance and cost so that savings growing out of possible improvements may be estimated and balanced against the cost of making the necessary changes. The preceding article in this series (March *Coal Age*) showed how time-study findings could be used, under a set of conditions closely paralleling those at many operations, to increase production time at the face from 33 to 66 percent and cut cost as much as 29.5c per ton by reducing the delays attributable to management.

Time study also is employed to develop standards for use in production control, purchase of additional equipment, planning additional manpower requirements, balancing production against capacity and — possibly — establishment of either competitive or financial incentives.

Time study is a management tool for analyzing not only the work done in a given operation but also the effectiveness of managerial methods having a bearing on that operation. Development of theoretical standards of performance and the setting up of theoretical productions from given operations on the basis of no delays and the men working as hard as they can are *not* the most important goals in time study. Rather, time study is most valuable in determining just what delays—of all kinds—do occur, thus making it possible to compute the cost of these delays and take appropriate steps to remove the causes.

Time study frequently shows that delays caused by faulty managerial methods and poorly planned work results in greater production losses than both deliberate and unintentional delays by workers. In the example discussed in the previous article, coal was being loaded only 33 percent of the time. Since the example operation is characteristic of many actual ones, it can be assumed that the operation already had raised its efficiency several times before it was time-studied. Yet, non-productive time still was high—67 percent.

Of the 67 percent total, 7 percent was directly attributable to the men, divided as follows: slow inbound man-trips (outbound trips averaged 10 minutes faster) and leaving the face early, 5 percent; intentional soldiering and miscellaneous personal or non-recurring delays, 2 percent.

The remaining non-productive

time—60 percent—might be broken down two ways by causes: (1) inefficient working methods and (2) inefficient managerial procedures. These delays are attributed to management because management is responsible for discovering the best methods of using the equipment and manpower assigned to a job, training the workers and then seeing that these most efficient methods are followed. Management also is responsible for seeing that the proper facilities and methods are at the proper place at the proper time, and that the equipment is kept in good repair.

Inefficient working methods were responsible in our example for the following non-productive time at the face:

	Percent
Move cars	21
Move machine, get ready to load	12
Place not ready (no coal)	10

Inefficient managerial procedures were responsible for losses in three other classifications:

	Percent
Machine repair	8
No cars	6
No or bad power	3

To use time study only to measure how much coal the crew should load under these conditions would be to disregard 90 percent of the value of the study. At best, with the offering of a financial incentive, only 7 percent of the delay time could be eliminated, plus whatever small gains would accrue from any miner "speed up" secured. However, it is questionable whether even these small gains could be achieved, since the management is unable to supply cars, power or a usable machine for 17 percent of the shift.

Before management, therefore, can expect increased effort and elimination of unnecessary delays by the miner, it must first put its own house in order and meet its obligations by providing the best possible working conditions and furnishing the workers with adequate facilities and equipment—in good working condition. Last month's article explained the production-management principles used in analyzing time-study findings and improving working methods and managerial procedures.

TIME-STUDY EQUIPMENT

For making time studies, the most convenient timing device is a decimal-minute stopwatch of the type shown in Fig. 1. The minute is divided into hundredths instead of seconds, eliminating the figuring required to convert minutes into seconds, and vice versa, in subsequent computations. Also required is a clip board to hold the time-study sheets. It is much more convenient if the board is equipped with a watch holder, as in Fig. 1.

Underground studies are difficult, primarily because of lighting conditions. The machine or people being studied must be watched constantly and, with every change in activity, the time must be observed and recorded, along with a description of what occurred—all the while still keeping an eye on the work going on. The writer found it worth carrying the extra battery to have an extra light on the chest about two buttons below the collar. Tissue paper over the lens diffused the beam and the light permitted reading and writing with the cap lamp pointed toward the work center. Without this extra light it was necessary to lower the head unnaturally low in making an entry on the sheet. The necessity for shifting the lamp beam also resulted in delay in reading the watch, reducing the accuracy of the observations.

An extra mechanical pencil, along with the extra light, greatly reduces the possibility of the continuity of the study being broken. Hours of work could be lost because a pencil was dropped in walking or the observer was left in the dark.

In addition to the preceding, a 50-ft. tape is necessary to measure face width, coal height, and, possibly, travel distance if it appears that the mining plan is not being followed closely.

MAKING THE TIME STUDY

Since there are many excellent books on the techniques of making time studies, this article will not go into these in detail, but will try to show how they are applied to underground operations. Good texts include the following:

"Time and Motion Study," Lowrey, Maynard and Stegmartin, McGraw-Hill Book Co.

"Time Study for Cost Control," Phil Carrol, McGraw-Hill.

"Motion and Time Study," Ralph M. Barnes, John Wiley & Sons, Inc.

Determining Elements—In making a time study the job must first be broken down into "elements"; i. e., the smallest practical work divisions that can be observed, using natural dividing points. When the study has been so divided and each element timed separately, it will be found that some elements are "Constants" and some "Variables." A "Constant" is an operation that requires the same length of time each time it occurs. A "Variable" is an operation requiring varying lengths of time because of variations in the work to be done. As examples, the time the machine must run to load a car varies with the tons capacity of the car and the time required to bring an empty car to the face varies by the distance it must be moved.

In a properly made time study "Constants" and "Variables" are recorded separately, never combined. A clear description of each element, with the starting and stopping points clearly defined, also is recorded. For "Variables" elements, the measurements or quantities controlling the time required (feet, tons, etc.) also must be recorded, along with the description of the operation and the watch time.

Watch readings are recorded on the "continuous-reading" basis: that is, the watch is started at zero when the study is started. When the first-element breaking point is observed, the time shown by the watch is recorded opposite the element description. The watch is *not* stopped or snapped back. When the second element is completed, the time is recorded and so on through the entire job. By subtracting the time recorded at the end of the first element from that at the end of the second the elapsed time for the second element can be determined. Following this method makes sure that all the time is accounted for.

As work elements in coal mining usually do not occur in the same order all the time, the type of study made is known as "non-repetitive." Consequently, it is not possible to write element descriptions in advance, as the order of occurrence is changing constantly and new elements are frequently introduced. Fortunately, most of the elements are comparatively lengthy, thus providing time to describe the work as it is going on. Numbers or letters are assigned to frequently occurring elements and are used after the elements are first described. Repeating the element description then becomes unnecessary. The number or letter is used instead.

As a guide to dividing operations into elements, what must be recorded and how the data should be computed and used, the following examples will be the basis for the remainder of this discussion: crawler loader driving three and four parallel headings in coal 43 to 46

in. thick with the top varying from sandstone to 3 to 11 in. of drawslate.

Studies of the loading machine extending over several shifts are necessary for a composite of the conditions normally encountered. In addition, check studies of not less than one shift must be made for all other crew members to determine how well the work load is distributed. How these check studies are used in redistributing the work to eliminate delays inherent in methods employed was discussed in the previous article.

Typical studies and how they were broken down are shown in the following. "Constants" in the list of elements are preceded by the letter "C" and "Variables" by the letter "V."

Loader Operator and Helper

V. Operate machine, including jockeying for position to load one car of coal. Each car tagged to permit recording weight at tipple.
C. Wait for motor crew to change cars.
C. Wait for motor crew to get new trip.
C. Stop machine to pick down coal.
C. Stop machine to break rock.
C. Stop machine to remove rock.
C. Clean up floor or gob slate while waiting for motor crew to change cars.
V. Move machine from face to face; distance traveled recorded.
V. Wait for motor crew to return with cars after moving.
C. Grease machine.
C. Locate tools and get ready.
C. Mantrip time.
C. Lunch.
Other delays as listed in the first article.

Motorman and Snapper

V. Pulled loaded car to cutoff.
C. Switch load into cutoff.
C. Uncouple and back out.
V. Return to loader with empties.
V. Wait for machine to load car; shift car on signal from machine operator or snapper.
C. Couple to loads in cutoff.
V. Pull five loads to loaded track.
C. Switch loads to loaded track and uncouple.
V. Run to empty track.
C. Switch to empty track.
C. Couple up and start with five empties.
C. Other delays contributing to loader delays previously noted.

Later, when methods investigations indicated that larger trips could be used, the elements were retimed. The results showed that length of the trip had no effect on time for travel per foot, loading car or uncoupling a trip of cars.

Cutter Operator and Helper

V. Tram machine to new face.
C. Unload and prepare to cut.
C. Sump.
V. Cut across face. The distance cut, as well as distance traveled in moving, was recorded.
C. Inspect top.
C. Load machine.
C. Change bits.
C. Prepare to drill.
C. Drill one hole.
C. Sharpen auger.
C. Put drill away.

These times were recorded so that the elemental times obtained could be used to determine the time to perform the operation with from two to four men.

Timberman

V. Unload timbers; number of times also was recorded.
C. Carry timbers to face.
C. Go to face and prepare to timber.
C. Set one timber with wedges.
C. Set one timber with capboard.
C. Take sights.
C. Clean floor before setting.
C. Scale top.
C. Dig out floor.
C. Cut off one timber.
C. Bring capboards and wedges to face.
C. Get one timber and try for length.
V. Move to next place timber is to be set; distance traveled recorded.

Various delays also were noted which had no effect on the loader crew. They aggregated 19 percent of the total of the time studies, and were:

Wait for timber.
Wait for shotfirer.
Doubt about what to do next.
Hunt for shovel.
Wait for loader.
Personal time.

Shotfirer

V. Travel next place; distance also recorded.
C. Prepare to bugdust.
V. Bugdust cut; width of cut also recorded.
C. Prepare to load holes.
C. Load one hole.
C. Prepare to shoot.
C. Connect cable to one hole.
V. Walk to crosscut paying out cable; distance walked also recorded.
C. Shoot first shot.
V. Return to face, connect one hole and return to crosscut; distance traveled also recorded.
C. Shoot each additional shot.
V. Roll up cable and collect tools; length of cable used also recorded.
C. Go to powder station, get powder and detonators for next face and return.
V. Take tools and powder to next place; distance between faces also recorded.
C. Wait for cutting machine.
C. Gob slate while waiting for cutting machine.
C. Personal time.
C. Excess lunch time.

The last four delays totaled 40 percent of the total of the time studied. Nevertheless, the shotfirer could keep up with the cutting machine without difficulty. In view of this, as outlined in the previous material, there was ample time for the shotfirer to take over the drilling.

Under the conditions we have assumed, it is difficult to make a satisfactory study of tracklaying and track pickup operations that can be related directly to the remainder of the crew. Normally however, observation usually is sufficient to determine if the tracklayer is keeping up with track extension and switchlaying and, therefore, is not delaying the other crew members. An experienced trackman ordinarily can do this.

DEVELOPING THE DATA

After each study was made the watch readings were subtracted, thereby determining the elapsed time each time the element was performed. All the studies then were tabulated in two ways:

1. Each elemental time for each occurrence of an element. This tabulation is used for developing standard time formulas, the computation and use of which will be discussed later.

2. Total time for each of the work elements and for each of the major delays. The results of such a tabulation are shown in Fig. 2.

It will be noted that the time the machine was actually loading coal, or the productive time, was only 33 percent of the time spent at the face. The remaining 67 percent is non-productive. Study of this nonproductive time to reduce it as much as possible can result in sub-

Table I—Basic Time Formula for Loading Machine

Element Number and Description	Basic Time Unit	Minutes per Time Unit
1. Load one car coal	Time per gross ton loaded	0.652
2. Pull loaded car	A. Time per car	0.248
	B. Time per foot to temporary storage track	0.0028
3. Switch loaded car to temporary storage, uncouple and back out	Per loaded car	0.41
4. Push empties to loader	A. Per foot from temporary storage to face	0.0036
	B. Per foot from empty sidetrack to loader	0.0034
*5. Couple to loads on temporary storage track	Per face loaded	0.52
*6. Pull loads to loaded sidetrack	Per foot from temporary to loaded sidetrack	0.0033
*7. Switch loads to loaded sidetrack and block	Per foot of distance between sidetracks	0.85
*8. Run to empty sidetrack	Per foot between sidetracks	0.0033
*9. Make up empty trip	Per face loaded	1.28
*10. Pick up tools and tram to next place	A. Per face loaded	5.60
	B. Per foot of travel	0.0030
11. Miscellaneous duties (break slate, gob slate, clean up, pick down coal, etc.)	Per gross ton loaded	0.0479
12. Load one car rock	Per car level full	6.40
13. Daily allowance to get ready and grease	Percent total developed time per gross ton or car	3.33
14. Personal, fatigue and delay allowance	Percent total developed time per gross ton or car	13.00
15. Incentive allowance	Percent of total time per gross ton or car	25.00

* In developing the time standard and determining the time required to change faces, use either the time required to get a new trip or the time to tram the loader from one place to the next, whichever is less. Do not use both times. Use either a combination of Elements 4 through 9 or Element 10.

stantial production increases, as shown last month.

Development of Basic Time Formulas—As the operation of the loading machine depends upon the work of the motor crew, it is necessary to combine the section locomotive and loader studies to arrive at a standard. When all studies have been completed and each timed element converted to a time per unit, the times obtained from the several studies were compared and the normal good time per unit determined.

Those times which notes indicated were affected by unusual conditions were eliminated from the computations.

Times for loading cars and tramming the machine between places, as well as the time for such miscellaneous loader-crew duties as breaking slate, picking down coal, gobbing slate and the like, was determined from the loader-crew studies. The average time the loader had to wait while cars were being changed, or while a new trip was being obtained, was determined from the section motor-crew study. It was further determined that a daily allowance of 15 minutes, or 3 1/3 percent, had to be made for the crew to get ready and grease the machine before starting.

Other allowances were: personal time, 2 percent; fatigue, 5 percent; miscellaneous delays, 6 percent; total, 13 percent.

Table I shows the basic time formula developed. Its use in calculating time standards for various mining operations will be discussed later.

Standards for cutting, drilling and shooting were developed the same way to be certain that the time for cutting, drilling and shooting was the same as that required to load; in other words, to be sure that work load of the two crews was balanced. Similarly, a timbering formula was developed to determine whether the timbering work load was in balance with the other work. The time required to set one timber was obtained by taking a weighted average of the setting times under the various conditions encountered. Weighting was necessary to take into account the various types of timbering plans required by the varying conditions.

USING THE DATA

We now have two major types of information available: (1) the time required to perform the elements of work necessary to get the coal into the cars, and (2) the time lost and the reasons why cars could not be loaded (Fig. 2).

The time studies and accompanying data, therefore, point out:

1. The reasons for less than rated production from the loading machines.

2. The relative importance of the various functions of management that must be studied to eliminate the causes of delays.

3. The tonnage to be expected under existing conditions and the tonnage to be expected if the causes of delays are removed.

Inspection of Fig. 2 makes the following investigations obvious:

1. Methods investigation to reduce car-changing time.

2. Methods investigation to develop procedures insuring coal always ready for the machine to load.

3. Methods investigation to develop procedure insuring that empty cars will be available at the face at all times.

4. Investigation of maintenance procedures to reduce machine breakdowns.

5. Meetings with supervisors to bring out to them the importance of the many minor delays for which they are responsible, and so that they can exchange ideas on ways and means.

As a result of the foregoing analysis, the following recommendations were in order:

1. Changes in section motor-crew operations to reduce car changing time and save 10 percent of the time at the face.

2. Addition of one man to the crew and redistribution of the work load, saving 5 percent of the time at the face.

3. Installation of planned production control through adoption of a revised dispatching system, insuring constant control of empty-car distribution throughout the mine.

As noted, the principles involved in methods improvement were discussed in the previous article.

PRODUCTION STANDARDS

To know what costs should be, making possible, if desired, a "standard" rather than an "actual"

Table II—Work Sheet for Formulating Time Standard for Loading Coal

	Basic Time, Machine Minutes	Double-Cut Distance, Factor	Feet	Weight, Gross Tons	Machine Minutes per Gross Ton Subtotal	Total
1. Load one car coal	0.652 per ton	———	———	———	———	0.6520
2. Pull loaded car	0.248 per car	———	———	3.4 per car	———	0.0730
	0.0028 per foot	———	121 per car	3.4 per car	———	0.0980
3. Return with empty	0.0036 per foot	———	121 per car	3.4 per car	———	0.1260
4. Push empties from sidetrack to loader	0.0034 per foot	0.70	466 per face	23 per face	0.0482	———
5. Couple loads for trip to sidetrack	0.52 per face	0.70	———	23 per face	0.0158	———
6. Pull loads to sidetrack	0.0033 per foot	0.70	251 per face	23 per face	0.0252	———
7. Switch in and block loads	0.85 per face	0.70	———	23 per face	0.0259	———
8. Run to empty sidetrack	0.0033 per foot	0.70	153 per face	23 per face	0.0154	———
9. Make up empty trip	1.28 per face	0.70	———	23 per face	0.0390	
Total time to get new trip					0.1695*	0.1695
10. Tram loader to next place	4.60 per face	0.70	———	23 per face	0.1370	———
	0.0030 per foot	0.70	210 per face	23 per face	0.0192	
Total loader tramming time					0.1562*	
11. Miscellaneous loader work	0.0479 per ton	———	———	———	———	0.0479
Total net machine minutes						1.1664
12. Total time per ton with machine maintenance allowance (1.1664 x 1.033)						1.2049
13. Total time per ton with personal, fatigue and delay allowance (1.2049 x 1.13)						1.3615
14. Total time per ton with incentive allowance (1.3615 x 1.25)						1.6929
Total time allowance per ton						1.6929
Standard machine-hours per ton (1.6929 ÷ 60)						0.0283
Standard man-hours per ton (0.283 times 11 men)						0.3113

* Since total time to get a new trip exceeds time to tram the loader to the next place, it is the controlling factor and therefore is used to compute the machine minutes per gross ton. If the loader tramming time was greater, it would be used instead.

cost system, it is essential to know how many tons can be handled or produced per hour by each man in the mine. This same information is essential for planning accurate movement and distribution of cars. It may be obtained from the standard time formulas previously discussed. This time, expressed man-hours per production unit, is known as a "Time Standard" or "Production Standard."

Use of Formulas to Set Standards—From the height of the coal seam and the engineers' projection of the places to be worked, the square feet of face area and the tons per face may be determined and used in the basic time formula shown. Distances traveled also may be obtained from the map or projection. It may be necessary to use a factor with some of the time to compensate for the fact that when crosscuts are made a double cut is put in and travel to this extra face is reduced. The final result of incorporating these factors in the basic time formula is a time expressed in machine minutes per ton.

As it is assumed that in our example an incentive plan is to be recommended, it is necessary to add an incentive to the standard so that the men can earn a bonus for reaching standard production. The recommended incentive was 25 percent. Therefore, the machine minutes were increased 25 percent so that a bonus could be earned. The resulting time is then multiplied by the number of men in the crew—in this case 10 men and a foreman, or a total of 11. The result divided by 60 is standard man-hours per ton.

Examples of the resulting standards are:

Driving three headings on 50-ft. centers with crosscuts every 60 ft., No. 1 heading to be 15 ft. wide; Nos. 2 and 3 to be 25 ft.:

Standard hours per gross ton of coal	0.295
Standard hours per car of rock	2.920

Driving four headings on 50-ft. centers with crosscuts every 60 ft., No. 1. heading to be 15 ft. wide; Nos. 2, 3 and 4, 25 ft.:

Standard hours per gross ton of coal	0.311
Standard hours per car of rock	3.000

Table II shows how standards are computed. The production to be expected from a three-heading section using an 11-man crew would be 256 tons per shift; four-heading section, 243 tons, assuming in both cases that the shift is eight hours, travel and lunch time is 68 minutes and no other delays are encountered.

Knowing the standard hours per gross ton of coal, it is a simple matter to multiply by the shrinkage factor and the average hourly wage rate to arrive at the direct standard labor cost per net ton.

Knowing tons per hour, average tons per car may be divided into it to obtain cars loaded per hour for planning car supply and scheduling trips.

With this basic information available, management can maintain as close control over the money expended underground as is now maintained over the relatively much smaller sums involved in parts, supplies and maintenance labor above ground.

Modern production management need not—and should not—stop at the mine portal. A mine can and should be operated as efficiently as any factory processing a natural product. All that is necessary is for mine management to realize that they spend enough underground to warrant expenditures for investigations to find out how wisely that money is used, then use the information so collected to find ways to reduce and control those expenditures in the same way they are controlled in other industries.

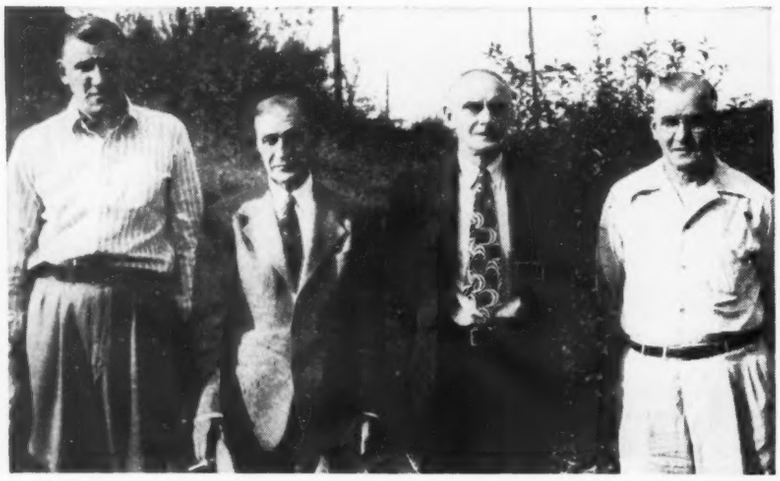
If this is done ,it is the writer's sincere belief that production costs can be greatly reduced without large capital expenditures—and it will be easier to meet the miners' demands for shorter hours and higher pay.

Left photo: Ray Hogan (left), rodman; B. M. Bunton, transitman; and Ray Corbin, mining engineer. Right photo: Austin Nizzi (left) and Ed Simpson, rodmen, Bevier Coal Co., Macon, Mo.

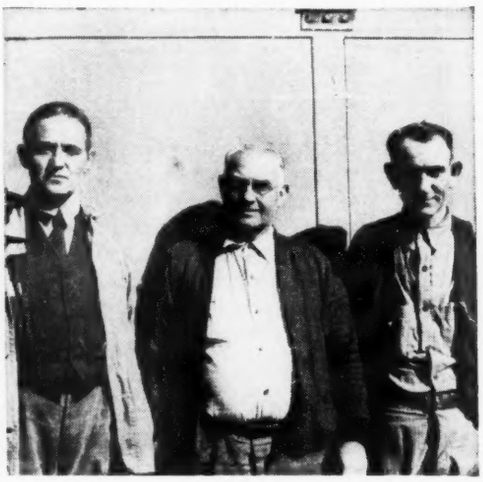
COAL MEN ON THE JOB

Ralph Furman (left) and Albert Hood, of the engineering staff, Warwick mine, Duquesne Light Co., Greensboro, Pa.

John Bibbee (left), coal inspector; Bill Liles, assistant to the preparation engineer; Bob Bovenizer, chief electrician; and Okey Howard, Jr., chief maintenance engineer, Piney Fork preparation plant, Hanna Coal Co.



Anthony Kavel (left) third-shift foreman; Alex Patterson, Thomas Callahan and William Peck, firebosses, Harwick mine of the Duquesne Light Co., Harwick, Pa., located near Pittsburgh.



F. M. Koprivnicar (left), mine foreman; A. Charlesworth, master mechanic; and George Stacy, electrician, Harwick mine.

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The Foremen's Forum

PREVENTING MOTOR DAMAGE FROM PHASE FAILURE

After a fuse has blown on a three-phase power circuit, this expression is often heard: "A fuse has blown and there is power on only two phases." With two fuses still good it is possible to have power on two lines —but not on two phases.

On a three-phase system, three conditions are possible: (1) three-phase power; (2) single-phase power; and (3) no power. There are two phase distribution systems, but blowing one fuse on the conventional three-phase system does not make it a two-phase one. Instead, when one fuse blows on a three-phase circuit, there is only one phase available for feeding the load. On a delta-connected system, there are three ways, depending upon which fuse blows, of establishing single-phase power from the three-phase source.

Protection for the majority of three-phase motor installations is such that if the motor attempts to start on single-phase power, a fuse will blow or the air circuit breaker will trip. This prevents the motor from attempting additional starts until the controls have been serviced. The real danger lies not so much in attempting to start a motor on single-phase power, but rather in trying to continue operation on single-phase power after having made a normal start on three-phase power.

Once running, three-phase induction and synchronous motors will continue to operate on single-phase power if the mechanical load is not too great. M.g. sets, fan motors, etc., which operate unattended for long periods, must have single-phase protection if operational delays and electrical repair costs are to be minimized. When a phase wire of a three-phase power circuit is open, the motor will not start from rest but will continue to run if the phase failure occurs after it reaches full speed. The rotating secondary causes the motor to operate as a phase converter to supply power to the other two phases and voltage to the open wire. The low-voltage protective equipment will not operate to stop the motor. At full motor load, the two remaining wires will have about 73 percent overload. The overload protective equipment may not operate to disconnect the motor from the line if the motor is running single phase a little under full load. Single-phase operation is damaging to a three-phase motor and, if the operation continues for some time, rewinding of the motor may be necessary.

Modern switchgear apparatus for portable m.g. sets includes, among other protective features, a reverse-phase or phase-balance current relay and a single- or reverse-phase voltage relay. The reverse-phase or phase-balance current relay functions on an unbalanced current condition, on reverse-phase flow of current, or both. This relay detects the instant the synchronous motor starts operating on single-phase power. It picks up the indication through an unbalanced-current condition and removes the m.g. set from service automatically. The unbalanced-current condition is the only suitable means of detecting single-phase operation while the equipment is running, since an under-voltage device cannot detect such a condition.

The other protective relay mentioned — the single- or reverse-phase voltage relay—functions in the presence of correct polyphase voltage, upon polyphase voltage of the correct phase rotation, or both. It tests the condition of the a.c. power supply relative to the voltage of the three phases and the phase sequence or phase rotation. It is essential that the motor have three-phase power of the correct phase rotation. Reversing the phase rotation of the power supply would cause the m.g. set or fan motor to rotate in a direction opposite from that in which it had been running.

There are many manually-operated substations in which an m.g. set must be started and stopped once each shift. Between these two prescribed visits to the substation the set generally is unattended. Many of these sets have been provided with d.c.-reclosing equipment because management readily appreciates the value of such equipment. Management is desirous of having the d.c. power restored immediately, and it does not wish to keep an attendant at the set merely to reset the d.c. circuit breaker.

If these m.g. sets are not also protected against single-phase operation, then management is running a considerable risk. Protecting the set on the 2,300- or 4,000-volt side with three

How Are You on Getting Jobs Done?

This quiz is designed to help you in your supervisory work. Study the questions, check "Yes" or "No" and turn to p. 114 for explanation.

1. Do you think it is worth while to plan ahead on regular or special jobs? ..... Yes ☐ No ☐
2. Do you feel that your men should be kept posted on future working plans as soon as they become known? ..... Yes ☐ No ☐
3. If you have something special coming up, do you think it's all right to wait and look it over when the time arrives? ..... Yes ☐ No ☐
4. Do you think it's a waste of time to explain why a job must be done and what it will accomplish? ..... Yes ☐ No ☐
5. Do you think your men should be able to figure out how to handle jobs by themselves? ..... Yes ☐ No ☐
6. Do you let your men themselves divide up the work as they go along? ..... Yes ☐ No ☐
7. Do you let your men set their own working pace? ..... Yes ☐ No ☐
8. Do you figure you will find out what tools and materials you will need when you get to the new job or new section? ..... Yes ☐ No ☐
9. Do you let your boss know how you are coming along and what difficulties you are encountering? ..... Yes ☐ No ☐
10. Do you talk over new jobs with other bosses who may have to help in the work? ..... Yes ☐ No ☐

MINE LUBRICANTS

MARATHON

V.E.P. OIL

Different! Proved for 10 years!

MARATHON V.E.P. OIL MAKES ENGINES LAST 50% LONGER

than they would with ordinary oil*

There's no other oil like V.E.P. It's patented! It's the pioneer, heavy-duty additive oil! Put it in any engine, gasoline or Diesel, and you'll get 50% more work between overhauls. Even more important, Marathon V.E.P. makes engines last 50% longer than they would with ordinary oil, *as proved in scientific tests and 10 years of job performance.

Marathon V.E.P. gives you everything you expect of the finest heavy-duty oil . . . plus these outstanding advantages:

- **V.E.P.'s "Magnetic-like" film** clings to vital engine parts, prevents damaging "dry" starts. "Stays put" at high temperatures. Protects bearings against corrosion.
- **V.E.P.'s constant cleaning action** keeps engines clean . . . valves and rings free . . . oil holes and lines open. Saves wear, saves fuel. Conserves power.
- **V.E.P.'s triple-plus film strength** gives more than 3 times as much protection as ordinary oil against heat, pressure, shock.

A COMPLETE LINE OF MARATHON LUBRICANTS FOR EVERY OPERATION IN YOUR STRIP OR SHAFT MINE

MARATHON

THE OHIO OIL COMPANY

Producers of Petroleum since 1887

GENERAL OFFICES: FINDLAY, OHIO • District Offices: Robinson, Ill., Indianapolis, Ind., Louisville, Ky.

fused primary cutouts is not adequate. The instant one fuse blows the motor will be on single-phase power and, with a fluctuating d.c. load, the set may operate that way the rest of the shift—cooking the motor winding and very likely causing it to catch fire. The cost of one rewinding job will, in all probability, buy the equipment necessary for adequate single-phase protection.

Getting Jobs Done

"Yes" should be the answer to Questions 1, 2, 9 and 10, p. 112. "No" should be the answers to all the others. The reasons are:

1. "Plan your work and work your plan" is always a good rule. The supervisor who looks ahead and thinks about what is coming up, even if it does not look like it will be much different from what he is doing at the moment, will find that he can get the job going faster and that his average efficiency will go up.

2. Since the supervisor, in the long run, must depend upon his men to get the work done, and since men usually will work better if they know what is going on, it is wise to try to keep them posted on future plans.

3. Confusion and loss of time is the inevitable result of going onto a new or special job cold. The wise supervisor will, if possible, try to look the ground over, decide how many men and how much material he will need and how he will tackle the job when the time comes.

4. If a job is out of the usual line —or even if it is much the same as the men have been handling in the past—they are likely to take a greater interest and work better if they know why the job is necessary and what it will accomplish. Working without any idea of what the goal is is as much a handicap to men as it is to management.

5. There is no surer way to cut efficiency and lose a lot of time than to let a gang of men figure out themselves how they will do a job, aside from the fact that it really is the responsibility of the supervisor. Suggestions should always be encouraged, but real results can be obtained only when the supervisor is prepared with clear and definite instructions to each man involved.

6. Here again, loss of time and lower efficiency is the inevitable result of letting a gang of men figure out how to divide up the work involved in a job, in addition to the fact that the responsibility again is the supervisor's. The boss should fix the duties of each man and make it clear to him what they are. Otherwise, not only is the work likely to suffer, but his authority and position as well.

7. If a boss is really a boss, he figures out when a job should be completed and lets his men know that he expects it at that time. In other words, it is up to him to set the pace—in a friendly manner but nevertheless definitely.

8. Along with men, completing a job involves tools and material. The results are better if the supervisor looks things over and orders what he thinks he will need in advance so they will be on the ground at starting time.

9. One of the first rules of management is to keep your boss posted on what you are doing and any problems you are encountering. It is his job to help you, and he can do that best if you let him know the situation regularly.

10. Since two or three departments may be involved in a new or special job, coordination is necessary to avoid confusion and lost time and motion. The wise boss always tries to get together with other supervisors when he knows that they also have an interest in anything coming up. It saves both him and them some headaches.

Buck-Passing Doesn't Pay

Management men who can't understand why some workers feel and act the way they do might learn something from this story, which describes the far-reaching effects of thoughtlessness, bad temper and buck-passing:

A superintendent gave a foreman a good dressing-down about production.

The foreman passed the blame along by bawling out a worker.

The worker went home angry and quarreled with his wife.

His wife got mad and lit into their young son with a whipping.

Junior, angry because he was whipped without reason, kicked the family dog.

The dog yowled, ran into the street and bit the leg of the first man that passed.

You guessed it!—the man the dog bit was the superintendent who had started the whole thing.

The moral: If you're to blame, take the rap yourself. If you're not, pick out the man who is and show him reasonably and politely where he was wrong and how he can improve his work.

—Adapted from West Virginia Coal & Coke Corp.'s *Safety News*

Working Well with Others

To work well with others is so important that it is worth while occasionally for a person to consider whether he is actually doing so, and to think how he may possibly do better.

The chief requirement for working well with others is wanting to. A man can be pleasant, cheerful, friendly, and helpful if he wants to. Aside from mere mechanical skill, the ability to work well with others means actually nothing more than to be always agreeable, always helpful. This is largely a matter of managing oneself, controlling and directing one's thoughts, one's emotions, and one's will-power.

One has everything to gain and nothing to lose from trying. For one thing, working well with others enables a man to enjoy his work. That in itself is a great advantage, because it's not possible to live a happy life unless one can really enjoy one's work.

—W. Va. Coal & Coke *Safety News*

What Workers Want

Three guideposts for foremen who want to keep their workers happy came to light when the Koppers Co., Pittsburgh, Pa., recently asked 7,100 employees in nearly 50 communities to "tell the boss" what they wanted from their jobs.

Among the five most important things picked out by the voters were these three in which the foreman plays a strong hand:

1. "A square boss"—Workers expect fair play. That means the foreman should divide work evenly, show no favorites and give the breaks to the men who earn them.

2. "A chance to get ahead"—Nobody wants to find himself up against a dead end. The reason lots of men think they have come to a dead end is that their boss fails to compliment them when they do a good job. When the boss says a kind word, a worker knows that he has earned a good standing in the boss' opinion and he has a better goal to aim for.

3. "Working on the job you prefer"—The man who has to work with a machine he can't handle or at a job he doesn't like soon becomes unhappy. With that, his efficiency slacks off. It's the foreman's job to see that his men are assigned to the jobs they are best fitted for. That means contented workers and higher efficiency, as well as a better front-office record.

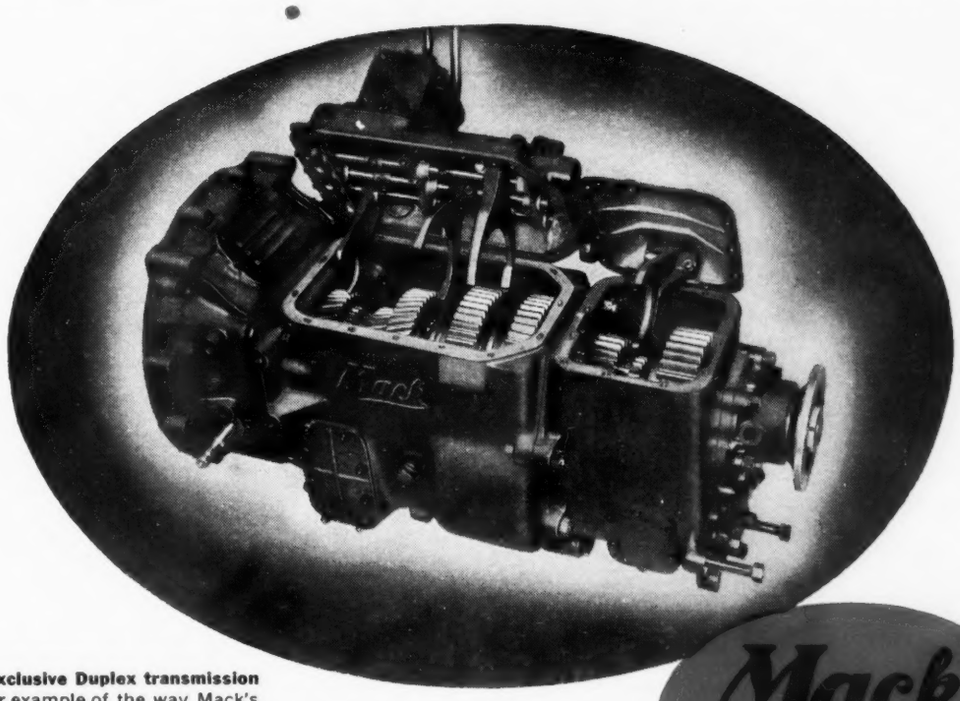
Two other matters ranked in the five most important things selected by workers: steady jobs and the size of the paycheck. Farther down the line in importance were such things as friendly working companions, medical and health benefits and vacations and holidays. The results of the poll, Kopper's officials say, will have an important bearing on the company's development of personnel policies and programs.

It may not be possible for all companies, including coal-mining companies, to poll their workers to find out what things are most important to them. But it is possible —and it's important, too— for foremen and supervisors to keep their ears to the ground and their eyes wide open to discover what makes and keeps workers happy.

you get more work out of Mack Trucks

Work done on the job is the one true yardstick of truck value. In coal stripping and open-pit mining, experience has proved to profit-wise operators that Mack trucks give full measure — and more — in extra tonnage per work-hour, enduring reliability and rock-bottom maintenance costs.

because . . . we put more work into Macks



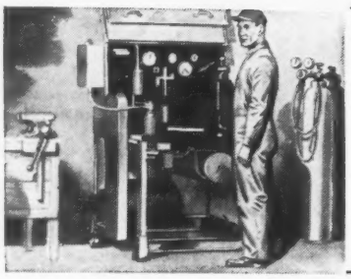
Mack's exclusive Duplex transmission is another example of the way Mack's better design pays off in better performance — on the job. Engineered as a single unit, the Mack Duplex gives eight forward speeds with easy even intervals between speeds. Closer steps result in higher average speed, easier shifting, better acceleration, improved fuel economy and less maintenance.

Mack
trucks for every purpose

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.

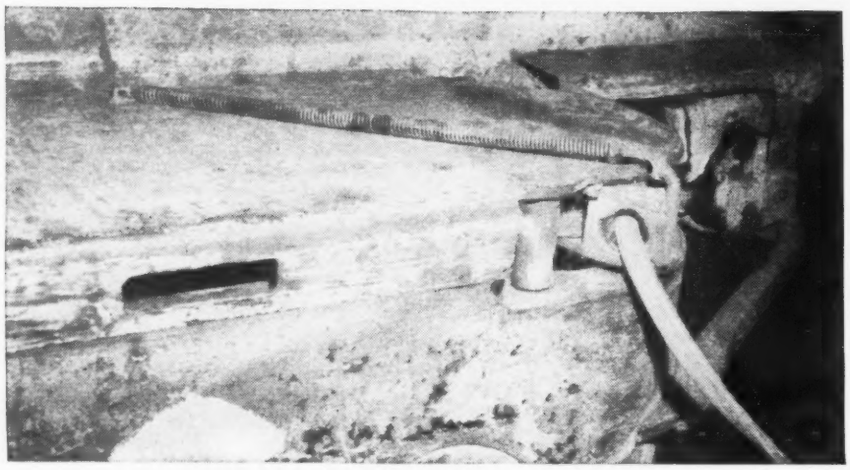
SINCE 1900, AMERICA'S HARDEST-WORKING TRUCK

6530



Operating Ideas

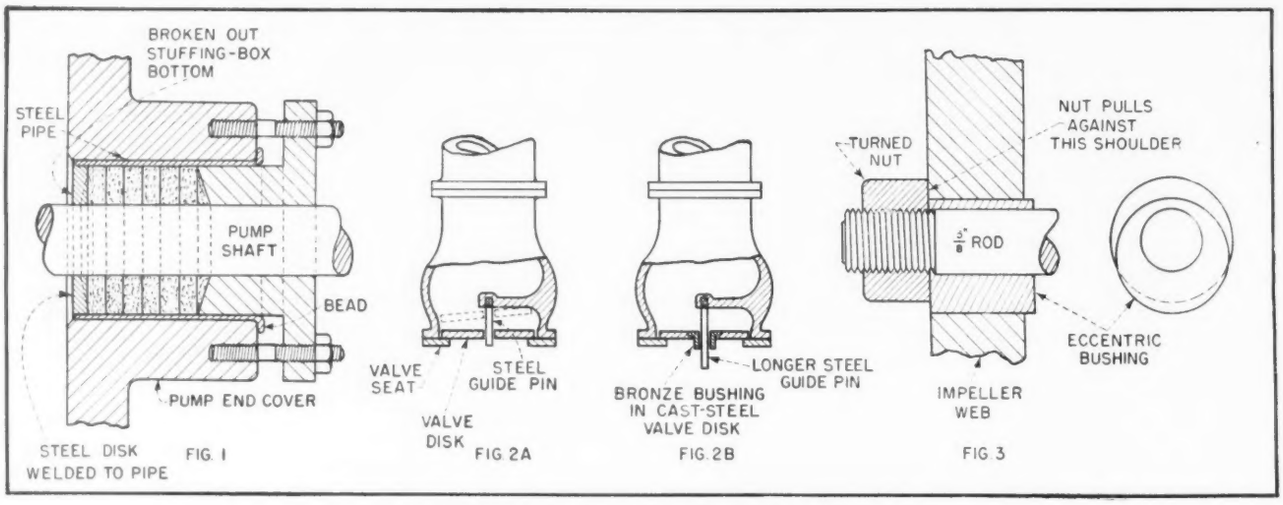
Coil Spring Reduces Strain on Trailing Cable



COIL SPRING holds guide arm in a high-torque position to relieve the strain on a shuttle-car trailing cable. Center-hanging of cable to reduce cable length or extend car travel has been successful with this attachment.

CENTER-HANGING of trailing cable for rubber-tired shuttle cars so that less cable may be used or so that car travel can exceed cable length sometimes has not been entirely satisfactory when first tried. At Galloway No. 3 mine, The Simpson Creek Collieries Co., Inc., Galloway, W. Va., however, Leonard Bell, section mechanic, suggested an improvement that solved the difficulty.

Originally, the cable received a severe jerk when the car, returning from the elevator, passed the point where the cable was connected to the power line. To meet this problem, a tension coil spring was installed from the end of the cable guide arm to an anchoring point well back of the pivot. The spring holds the guide arm in either a high- or low-torque position until the cable exerts sufficient force to pull the lever past center.



Pump Repairs Simplified

A SIMPLE WAY to repair a broken stuffing box of a pump, according to *Engineering and Mining Journal*, is shown in Fig. 1. A sleeve, with disk welded to one end, is inserted in the stuffing box. Then the sleeve is expanded with a boiler-tube expander, and beaded on the outer end. Finally, the stuffing-box flange is turned down to fit inside the sleeve, inserted in the stuffing box and drawn up.

In one Arizona mine, a leak in a foot valve was caused by a valve disk which hung up on a steel guide pin as shown in Fig. 2A. To repair this defect, the valve disk was fitted with a bronze guide bushing, and a longer guide pin was installed as shown in Fig. 2B. The repaired valve has performed perfectly for over two years.

Often impellers must be removed from multi-stage centrifugal pumps to repair rings and bushings in the diaphragms between the impellers. With the impellers tight on the shaft, and the diaphragms separating the impellers, it is impossible to get a nut on the end of the pulling rod which has been pushed through the holes provided in the web of the impeller. A copper mining company solved this problem by using special bolts like the one in Fig. 3. Two steel draw-bolts with hardened round nuts, and two eccentric bushings are needed for the job. The ends of the draw-bolts, with nuts attached, are pushed through the holes in the impellers. Eccentric bushings are slipped over the rods and into the impeller holes. The rods cannot be pulled through the holes, because the nuts shoulder against the impeller.

Hardened to Resist Abrasion

JALLOY STEEL

HEAT TREATED GRINDING MILL RODS

For rugged use in grinding hard ores specify Jalloy heat treated quenched and tempered bars. They are available with hardness values of 400 to 450 Brinell. Write for further information.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

Electrical Maintenance Check List

MOTORS

Keep the windings, ventilating ducts, commutators and brush rigging clean—In dusty locations, blow out weekly; under severe conditions, daily. Do not use air pressure higher than 50 lb.

Lubricate regularly, carefully—Follow manufacturer's instructions. Oil daily those motors that require it. Schedule definite oiling dates for the others. In dusty or damp locations, drain oil once a month and renew. Do not over-lubricate. It wastes oil, gets in windings and deteriorates insulation.

Examine bearings—Check daily on heavily used motors; once a week on others. Check oil ring. Feel for high temperatures. Check for excessive end play.

Check air gap between the rotor and the stator—Check weekly on motors that operate with excessive belt tension; others, once a month. Differences in width of gap indicate bearing wear which, once started, accelerates rapidly.

Inspect brushes and commutators—Check daily on those motors in severe service; others, once a week. Keep commutators smooth, with brushes seated perfectly. On carbon brushes use correct grade to prevent excessive commutator wear and control arcing.

Inspect all exposed motor leads—Check weekly. Keep connections tight, free from oil and moisture, well insulated and protected.

Inspect ground connections—Check weekly. Keep tight and in good condition. These are important to safety of employees and, in some cases, of current protective devices.

CONTROL EQUIPMENT

Includes magnetic switches, air and oil circuit breakers, controllers, compensators, etc.

Keep control equipment clean—Once a week, clean and blow out dirt and dust from starting switches, compensators and air circuit breakers. Under unusually clean conditions, clean out quarterly or semiannually. Keep dirt and dust off high-voltage bushings and terminals.

Keep contacts smooth—Inspect heavily used equipment weekly; others, once a month. File burned contacts smooth or replace. Do not lubricate contact surfaces.

Replace worn parts—Under severe conditions, examine all equipment monthly and replace all worn or burned parts; under normal conditions, semiannually. Keep adjustments correct.

Keep electrical and mechanical connections tight—Once a week, inspect parts that vibrate. Look for loose connections, missing or loose nuts and broken mechanical parts.

Keep oil at proper level and in good condition—Under severe conditions or in dirty or damp locations, make a monthly check of oil condition and oil level. Replace dirty or gummy oil. Keep level up to indicator.

Check overload devices—Circuit-breaker tripping points should be checked monthly. Replace dashpot oil if thick and gummy. Keep orifices in plunger clear. Keep leather bellows soft and pliable with neat's-foot oil. Be sure that heater coils for thermal overload relays are the correct size. Check overload relay settings every six months.

LIGHTNING ARRESTERS

Maintain ground connections—Inspect in early spring before the start of the lightning season. Check the condition and resistance of ground connections. Resistance should not be over 5 ohms. A buried water main provides good control. Never run ground wire through iron or steel pipe unless wire and pipe are bound together.

WIRING

Keep wiring in safe condition—Examine monthly where vibration exists. Keep lock nuts and bushings tight on conduit, cables and other raceways. Protect wire from oil and water. Keep open wiring tight, insulated and safe from mechanical injury. Inspect all wiring once a year.

Check extensions and drop cords—Examine every three months where use is heavy. Check closely where wire enters socket, plug, switch, etc. Replace or repair excess wear promptly. Keep drop cords away from nails, metal hooks, etc. Keep lamp guards in place.

Keep switch, junction, fuse and panel boxes clean and tightly covered—In dusty locations, clean out weekly. Keep covers and unused "knockout" plugs in place. Inspect monthly.

FUSES

Check size—Twice a year, inspect all fuses to determine that circuits are not overfused.

Keep fuse clips clean and tight—Check connections to prevent overheating and breakdown.

Maintain refillable type fuses—Replace charred casings. Keep fuse assembly tight. Refill with links at the same rating as the casing.

Keep fuse and switch cabinets tight—Prevent escaping sparks when fuses blow by plugging unused knockouts. Always keep doors tightly closed and secured.

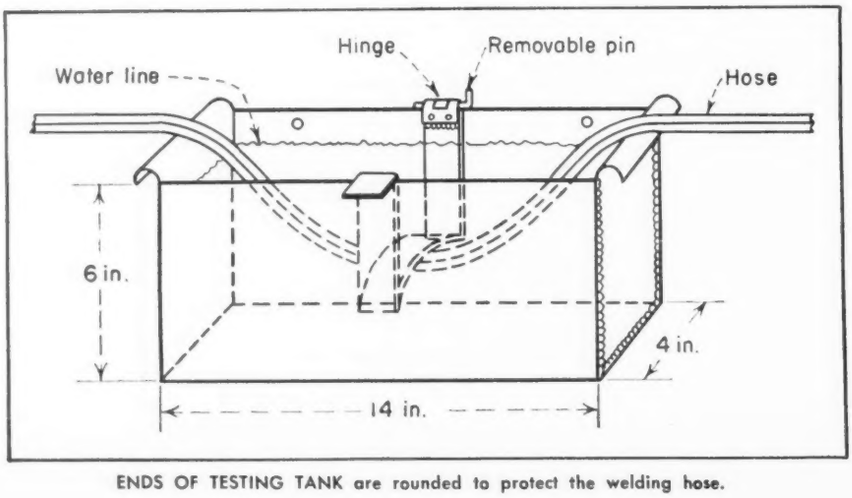
TRANSFORMERS

Keep oil in good condition—Test annually to determine dielectric strength. If less than 18 kilovolts in standard tester, recondition oil.

Maintain oil at proper level—Check oil level every three months. Replace leakage and evaporation loss promptly.

Prevent excessive temperatures—Test operating temperature of fully loaded transformer once a month. Temperature should never exceed 90 deg. C.

—*Westinghouse Electric Corp.*



ENDS OF TESTING TANK are rounded to protect the welding hose.

Hose Leaks Located With Portable Tank

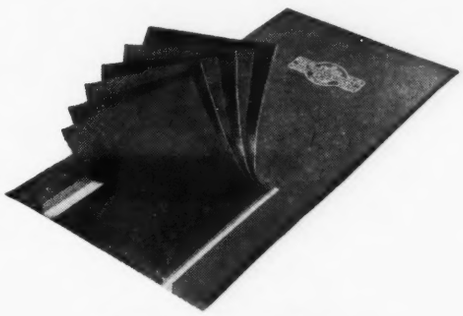
THIS WATER TANK for testing welding hose for leaks appeared in a recent issue of Linde Tips and was designed by Earl W. Kinney, Anaconda, Montana. The 4x6 by 14-in.-long portable tank has a removable bracket in the center for submerging the hose while it is being inspected. The hose can either be pulled through the tank or the tank can be moved along the hose line. It is possible to test the hose to within a few inches of the regulator gages.

Transmission Belting by Thermoid

The two grades of belting described here, cover the maximum range of industrial applications. Your Thermoid distributor will be glad to recommend the size and number of plies best suited to the particular service you have in mind.

For severe service, high speeds, small pulleys use Thermoid High Speed R*

Made of extra strong, hard, 35-ounce duck combined with top grade natural rubber friction and skim. This belt is extremely strong, flexible, and has a minimum amount of stretch. The square edges are protected by a sealing compound. All plies are straight-laid. Since there are no folds or seams, each ply carries its full share of the load. Supplied in cut or continuous length up to approximately 500 ft., or continuous wind endless, in all standard widths and any number of plies.



For regular service use Thermoid #400

A high-quality, brown-colored belt of finest 32-ounce fabric. This belt withstands severe flexing and shock loads. It is of folded-edge construction with a strong skim stock between the plies. Supplied in continuous lengths up to approximately 500 ft. in all standard widths and any number of plies. Also supplied endless with stitched diamond splice.

*Use Thermoid High Speed H (Hi-temp) where oil or grease is present.

It's good business to do business with Thermoid

You will like the personalized attention you get from Thermoid distributors, and you will appreciate the speed with which a specific problem can be handled by our distributors in conjunction with our sales engineers. Thermoid concentrates on a well-integrated line of industrial rubber products and friction materials, and is unusually well equipped to service your requirements.

The Thermoid Line Includes: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Custom Molded Products • Industrial Brake Linings and Friction Materials.

Thermoid

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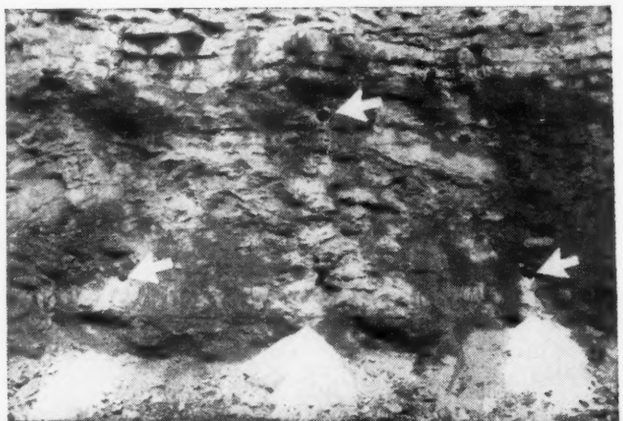
Automotive • Industrial • Oil Field • Textile Products

TWO-STORY DRILL RIG accommodated one high (9-in.) drill and two low (6-in.) drills.

HYDRAULIC FEED on each unit speeds drilling by making the auger advance in accordance with the hardness of the material being drilled. Holes are drilled from 36 to 75 ft.

HOW THE 9-IN. drill head is constructed with six supplementary chisel bits around regular head.



THE TOP HOLES are just under the limestone and the bottom ones are just above the blue rock.

Two-Story Drill Speeds Highwall Preparation

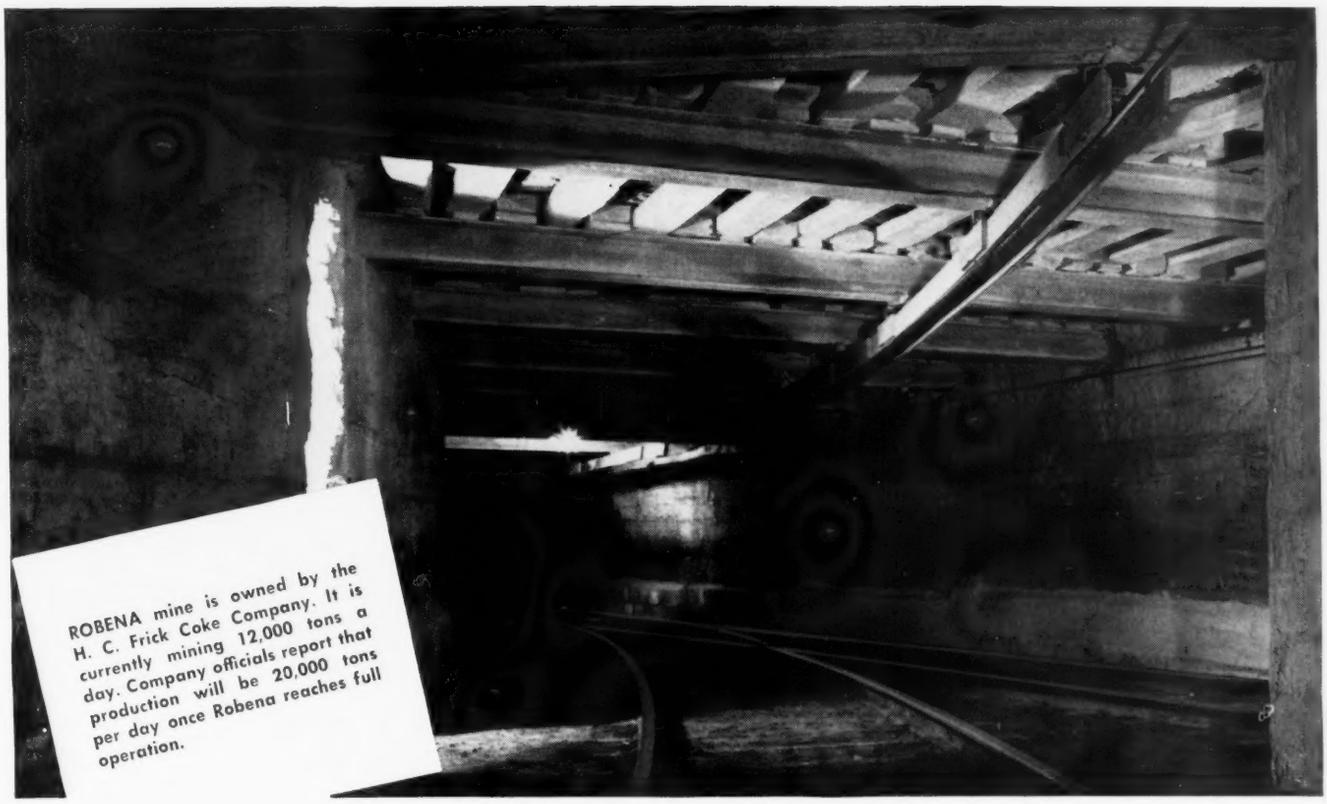
TWO-LEVEL DRILL RIGS, accommodating as many as three horizontal-type drills, accomplish speedier and better fragmentation of highwall material at the Georgetown No. 12 mine, Hanna Coal Co., St. Clairsville, Ohio.

The drill rig, shown in the accompanying illustrations, has electrically-driven drills equipped with hydraulic feeds. The upper drill, which makes a 9-in.-diameter hole, uses a combination head consisting of a 6-in. Kennametal-tipped three-way drill bit plus six chisel-shaped bits mounted in sets of two at 120-deg. intervals. The auger diameter was increased to 8½ in. by arc welding. Holes are drilled from 36 to 75 ft., horizontally, by extending the auger in 6-ft. sections. The top holes are drilled on 30-ft. centers 25 ft. above the coal and just under a 20-ft. layer of limestone. The 9-in. hole permits greater concentration of the charge beneath the layer of limestone and, using 250 to 280 lb. of Airmite per hole, good fragmentation of the rock is secured.

On the first level of the drill rig are places for two 6-in. drill units. At present, some of the three-drill rigs carry only one drill on this level, so that the upper and lower drills drill one hole for each 30-ft. move. The top holes are staggered with respect to the bottom ones. The lower holes, 6 in. in diameter and spotted 7 ft. above the coal, are drilled as much as 36 ft. deep and charged with 80 to 100 lb. of Airmite. While these holes are above the blue rock, the charge is sufficient to shatter the rock but the shock is not enough to chill the coal.

The holes are charged from the platforms of the drill rig and not more than 45 minutes elapses before the charges are fired.

Formerly, churn drills were used for preparing the overburden at Georgetown. With three of these two-story high-wall drills in service, the churn drills are used primarily for box-cut work and for opening abandoned pits that have caved, with obvious advantages in both operations.


ROBENA mine is owned by the H. C. Frick Coke Company. It is currently mining 12,000 tons a day. Company officials report that production will be 20,000 tons per day once Robena reaches full operation.

World's largest coal mine

USES DIRECT HITCHING AND STEEL MINE TIMBERS

ROBENA mine is not only outstanding because of its size. It is probably the most up-to-date mine in the world. It is fully mechanized. Every provision has been made for the worker's safety. That is why Robena uses *steel timbers* for the prevention of cave-ins and roof falls. Officials have reported that hitching steel mine timbers directly into ribs, or setting supports on steel sections hitched in is far superior to wall or pier timbering methods.

There are definite reasons for steel's superiority in timbering. New steel structural sections are balanced sections with definite uniform sectional properties. They can be purchased to guaranteed minimum physical properties with uniformity throughout. They are fabricated with greater ease and with less possibility of setting up future sources of danger. They are more economical and because they weigh less than second-hand rails of equivalent strength, new steel sections minimize labor and strain in handling.

We will gladly send you the booklet —SAFE SUPPORT PROVIDED BY HITCHING AND STEEL MINE TIMBERS—without obligation on your part. The booklet contains illustrations of the various methods of installing steel timbers as well as histories of several mines using steel timbers. Write now for your free copy.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

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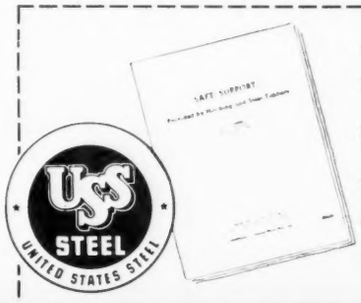

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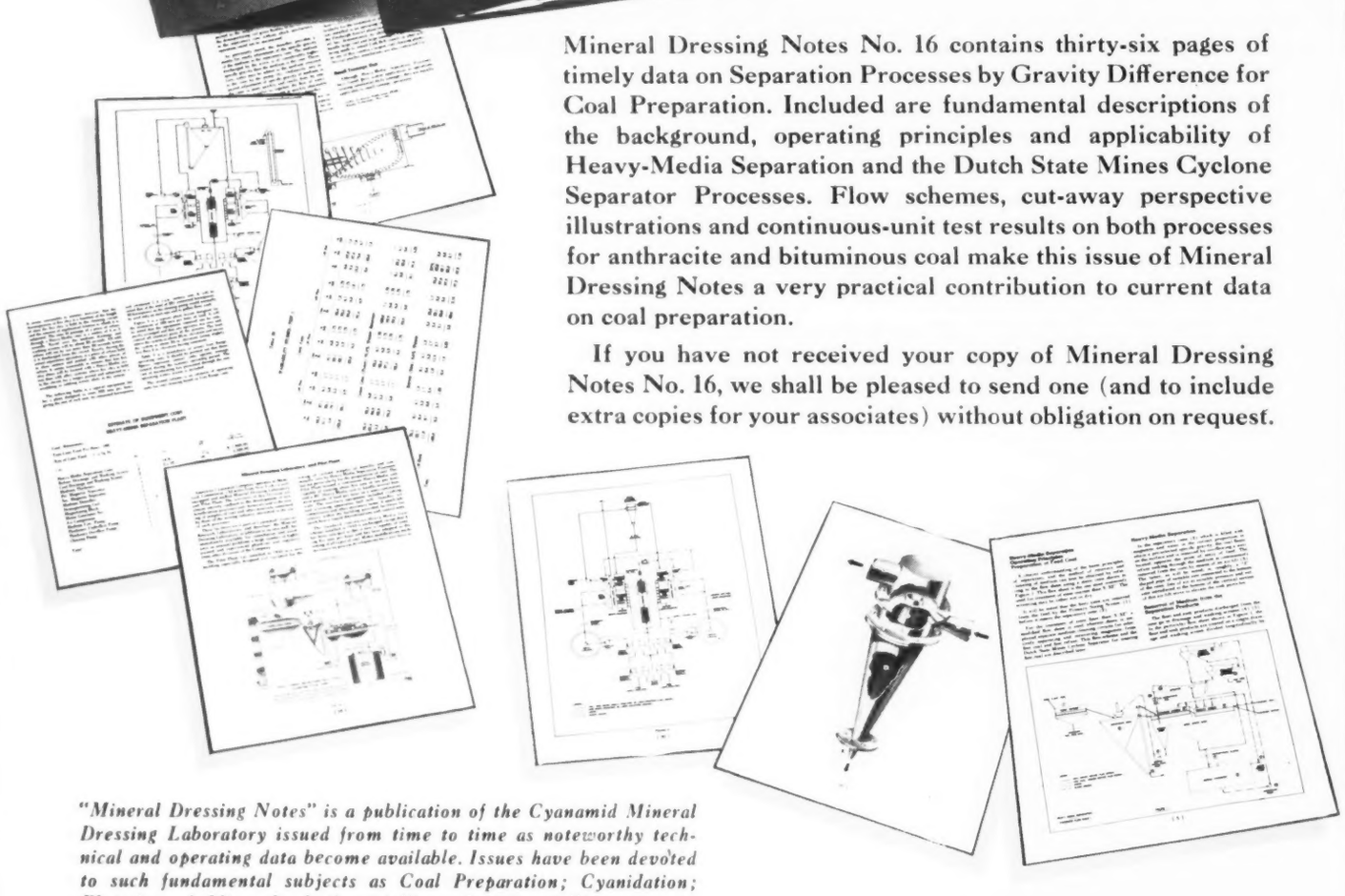
UNITED STATES STEEL

Coal Preparation

A *Significant* NEW ISSUE OF MINERAL DRESSING NOTES

WITH IMPORTANT NEW DATA ON SEPARATION PROCESSES *by* GRAVITY DIFFERENCE

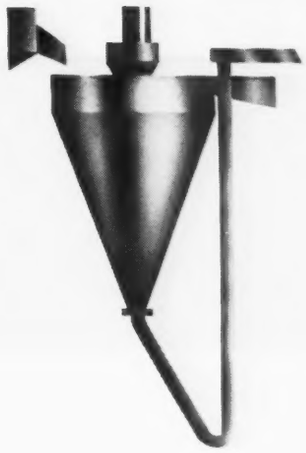


Mineral Dressing Notes No. 16 contains thirty-six pages of timely data on Separation Processes by Gravity Difference for Coal Preparation. Included are fundamental descriptions of the background, operating principles and applicability of Heavy-Media Separation and the Dutch State Mines Cyclone Separator Processes. Flow schemes, cut-away perspective illustrations and continuous-unit test results on both processes for anthracite and bituminous coal make this issue of Mineral Dressing Notes a very practical contribution to current data on coal preparation.

If you have not received your copy of Mineral Dressing Notes No. 16, we shall be pleased to send one (and to include extra copies for your associates) without obligation on request.

"Mineral Dressing Notes" is a publication of the Cyanamid Mineral Dressing Laboratory issued from time to time as noteworthy technical and operating data become available. Issues have been devoted to such fundamental subjects as Coal Preparation; Cyanidation; Flotation of Minerals, both metallic and non-metallic; etc., etc. This helpful publication is sent without charge, upon request, to metallurgists, coal preparation engineers and others interested in more efficient treatment of metallic and non-metallic minerals.

HEAVY-MEDIA SEPARATION PROCESSES



Precision cleaning over a full-size range with inherent advantages over previous preparation methods in cleaning coal with a high-percentage of near-gravity material. Extremely accurate on coal with a high and variable percentage of refuse. Functions efficiently at any desired gravity from 1.25 to 3.40. Gravity of the medium can be maintained within ±0.01 and quickly and easily adjusted as feed-coal changes. Low medium loss because of continuous automatic recovery and re-use of medium. Plants can be designed for multiple-product separation from run-of-mine feed in a full size-range to meet any present or future specification in any market. Equipment is standard and time-proved. Plants can be started or shut down without bank-loss of coal or medium or change in plant efficiency. Labor costs are low.

DUTCH STATE MINES CYCLONE SEPARATOR PROCESSES

Unique processes for coal preparation by gravity difference in the size range ¼" x 0, on either anthracite or bituminous. Small size, high capacity and utter simplicity of the separating equipment and its ingenious utilization of centrifugal and centripetal forces are inherent advantages. Uses low-cost magnetic medium, with provision for continuous, automatic medium recovery and re-use. Commercial size, continuous unit for testing carload lots now in operation in the Cyanamid Mineral Dressing Laboratory at Stamford, Conn.

With a process for every size and specification, and no self-interest in equipment manufacture or plant construction, Cyanamid offers unprejudiced counsel based on tests of your coal by various preparation processes in the Cyanamid Mineral Dressing Laboratory.

We invite discussion and stand ready to run carload tests on your coal; to cooperate with engineers of your choice in the design of efficient separation units, and to provide the practical assistance of Cyanamid Field Engineers in tuning up the installation.

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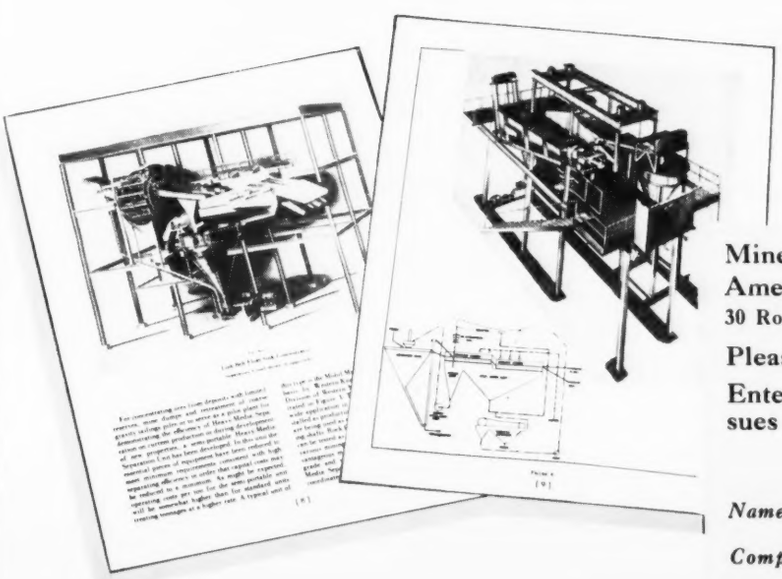

Mineral Dressing Division,
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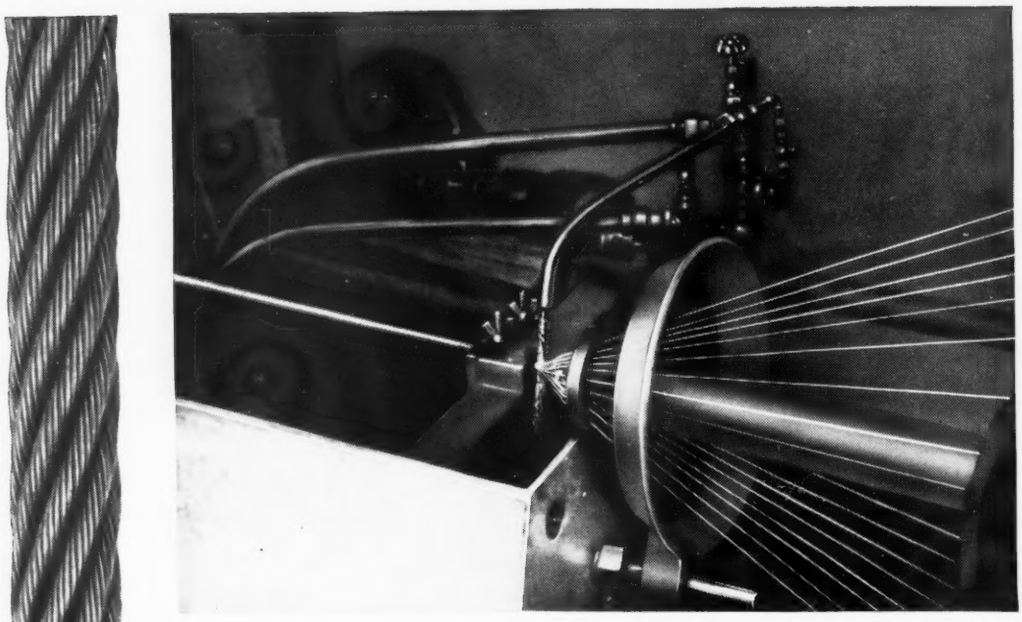

Hot Oil Treatment for Steel Muscles

THIS 82-PAGE BOOK ON WIRE ROPE IS FREE. WRITE FOR YOUR COPY TODAY!

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write—Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.

Field lubrication of wire rope does much to prevent friction and corrosion, but it is only a surface treatment. To provide proper *internal* lubrication, every strand of Wickwire Rope is actually formed in a stream of hot lubricant. This quick-setting lubricant packs the many spaces between the wires of the strand.

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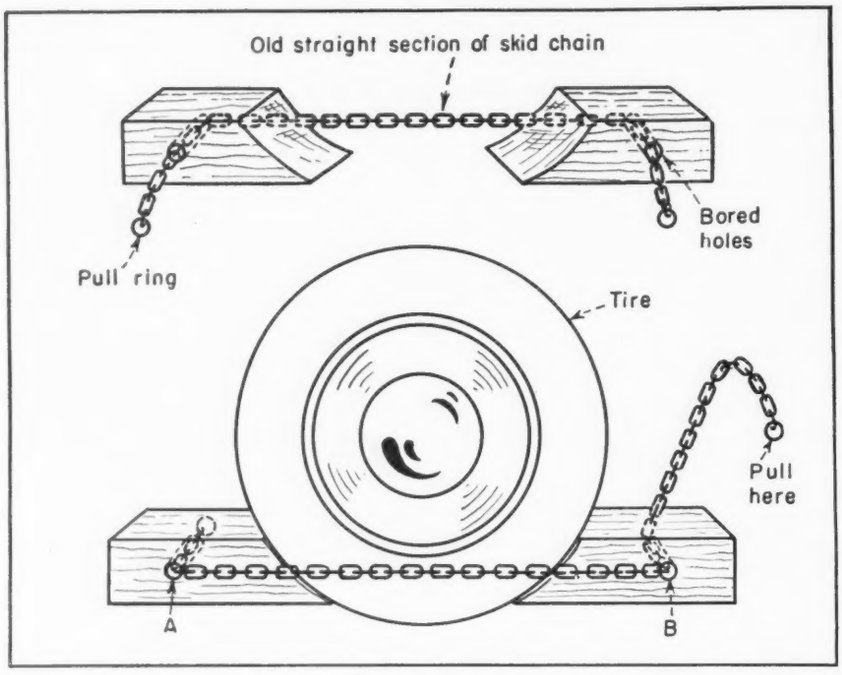


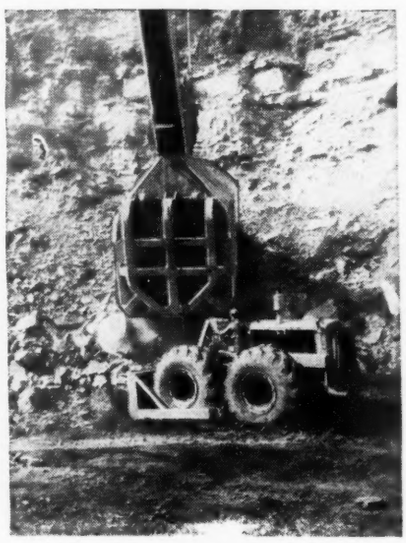
SAFETY BLOCKS are locked in place by pulling skid chain tight, preventing slippage or accidental removal.

Truck Safety Blocks Locked in Place

CONNECTING two safety blocks for blocking truck wheels during repairs or dumping, as shown in the accompanying illustration, will insure use of both blocks and prevent accidental removal of one by another worker during the operation, writes David B. Clapp, Newark, N. J. The pull rings on each end of the chain facilitate taking up slack to fit varying tire size and when the chain is pulled tight the blocks are locked in place, since the links bind at the 90-deg. bend through the holes.

As shown in the lower part of the illustration, to place the blocks in position, Block A is first put snugly against the wheel. Block B then is placed against the other side of the wheel and the chain pulled tight until the blocks are locked in place. Having the blocks connected by a chain also facilitates hanging them on a wall out of the way when not in use.

Bulldozer's Rubber Tires Protect Coal



ONE OF THE FIRST rubber-tired bulldozers to be assigned to stripping service (left). Speed enables this bulldozer (right) to keep up with every move of the dipper.

A RUBBER-TIRED BULLDOZER speeds clean-up work at the 40-yd. shovel without tearing up the surface of the exposed seam at the Georgetown No. 12 mine, Hanna Coal Co., St. Clairsville, Ohio.

The LeTourneau rubber-tired bulldozer, shown in the accompanying illustrations, is designed to be fast and shifty. In high gear, it can travel 20 m.p.h. The four 21.00x25 16-ply tires offer good traction without chewing action.

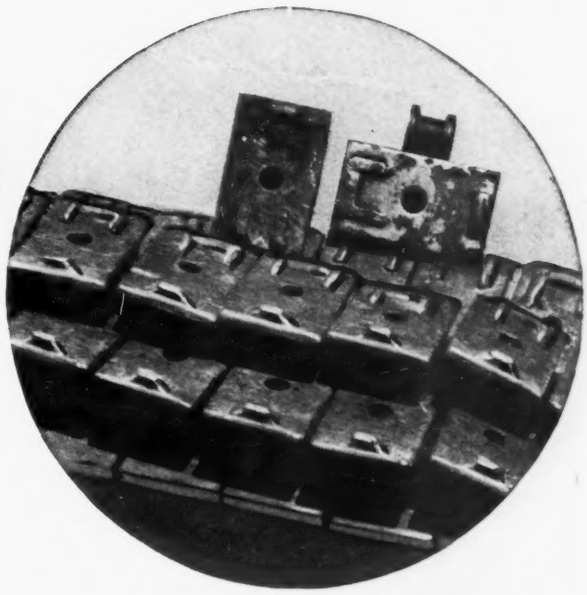
The operator, in this unit, is stationed in front of the motor where he has better visibility and where he can better judge his work.

It is expected that engine maintenance will be less because of the rubber-tired mounting, since vibration of the entire unit is reduced.

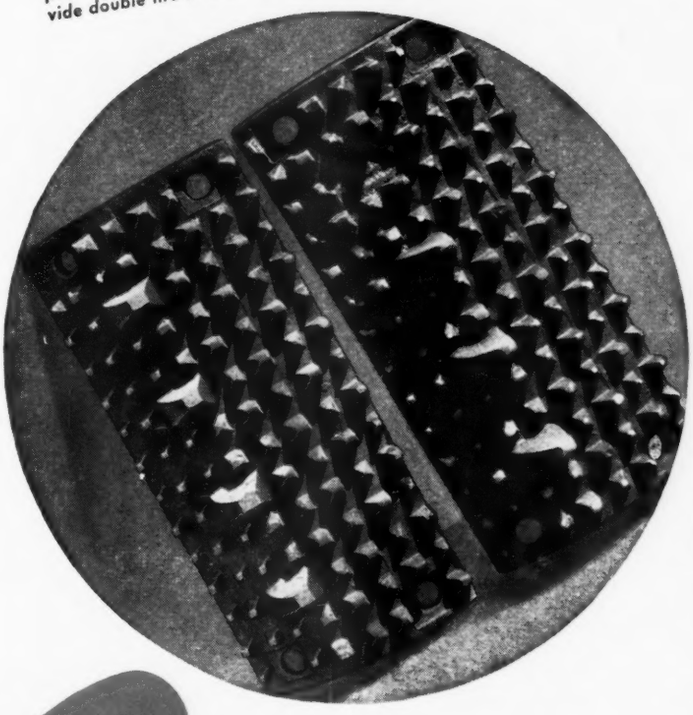
Smoother Sailing!

Operating ideas, often born of necessity, make for smoother sailing at many operations. Frequently they became the keystone on which associated operations depend. Because of their importance, we invite you to send in some of the mechanical, electrical, operating or safety ideas you are using. If accepted, COAL AGE, upon publication, will pay you $5 or more for each.

From CRAWLER PADS



These hard-faced Crawler Pads from a mechanical loader outlast unprotected pads 2 to 1. Two small beads of STOODY SELF-HARDENING, as illustrated, provide double life at a cost of only a few cents.



to CRUSHER SEGMENTS...

Life of these Crusher Segment Teeth, tipped with STOODY SELF-HARDENING, was tripled. The operation can be repeated as wear occurs, prolonging life indefinitely.

Renew LIFE

of wearing equipment with

STOODY

HARD-FACING ALLOYS

Increased mechanization in coal mining means increased wear problems, but *all* wear, whether it involves abrasion, impact, heat or corrosion, can be effectively retarded with STOODY HARD-FACING ALLOYS.

A single application of STOODY HARD-FACING usually doubles working life of equipment besides saving cost of replacements. When worn away, the alloy can be redeposited with similar results.

Stoody Alloys are provided in welding rod form for manual application and in fabricated wire in coils for continuous application by means of the Automatic Electric Welding Head. For building up worn areas prior to hard-facing, try Stoody Manganese, available in both fabricated electrodes and coils.

We will gladly recommend the most suitable alloys and hard-facing procedures for your wear problems. Write for literature.

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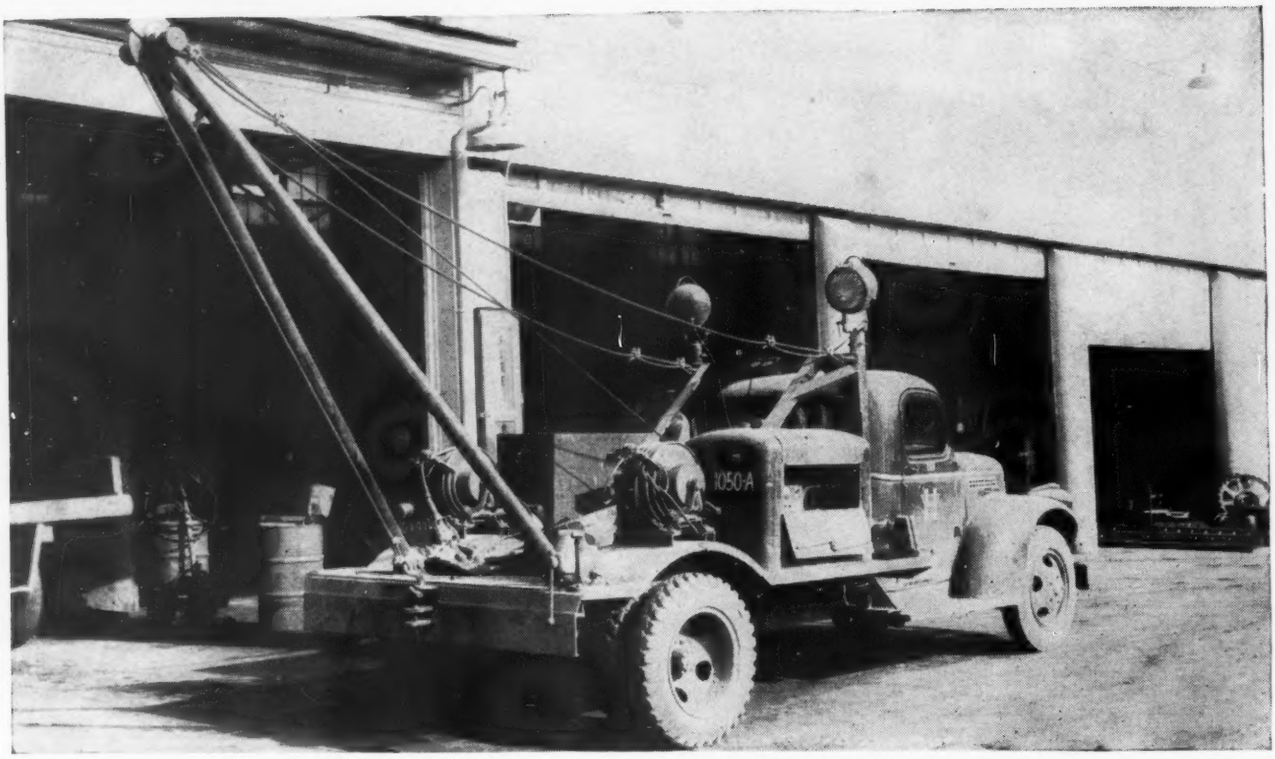


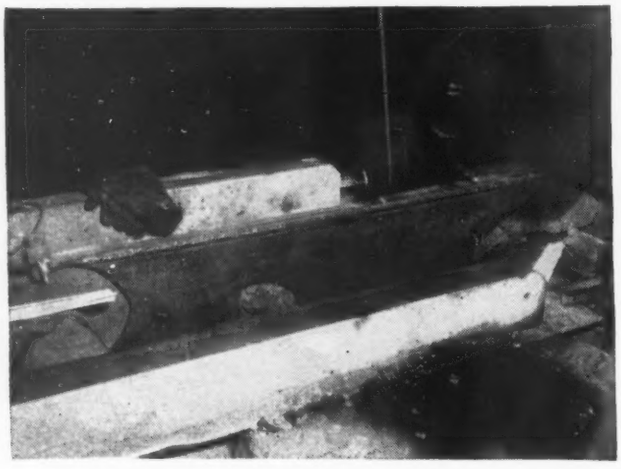
SELF-CONTAINED GENERATOR set makes night repairing in the field more feasible.

Wrecker-Service Truck Works Night and Day

A SELF-CONTAINED wrecker-service truck answers field calls night or day, says Carl Rogers, shop superintendent, Georgetown No. 12 mine, Hanna Coal Co., St. Clairsville, Ohio.

The combined wrecker-service truck, shown in the accompanying illustration, carries, among other items, oxy-acetylene apparatus and a self-contained engine-generator set. The generator, supplying power to both floodlights and extension lights, facilitates night repair work. An electric drill also can be operated from one of the extension cords very easily.

Both members of the service crew have had mechanic's training and can make minor repairs to equipment in the field or, if necessary, tow it back to the shop where more extensive repairs can be made.



STIFFENER PLATES are added on the insides of the I-beams.

CHESTER McBRIDE, welder, has reinforced frames of 25 trucks.

Stiffener Plates Solve Frame Trouble

I-BEAM FRAMES on all 25 15-cu. yd. end-dump Euclid trucks have been reinforced by stiffener plates, according to Lee W. Matthews, day foreman at the Georgetown No. 12 shop, Hanna Coal Co., St. Clairsville, Ohio.

The ½-in. thick plates, shown in the accompanying illustrations, are 10½ in. wide and 4 ft. long. The plates are placed parallel to the web of the I-beam and are welded to the inside edge of both flanges. All reinforcing had to be placed on the inside of the I-beams, since fuel tanks are crowded close to the outside of the beams.

Adding the ½-in. plates appears to have stopped the flexing and cracking of the frame which occurred as the dump body was returned to its traveling position.

FOLLOW THE SAFETY TRAIL WITH THE NEW U.S. ROYAL GOLD CABLES

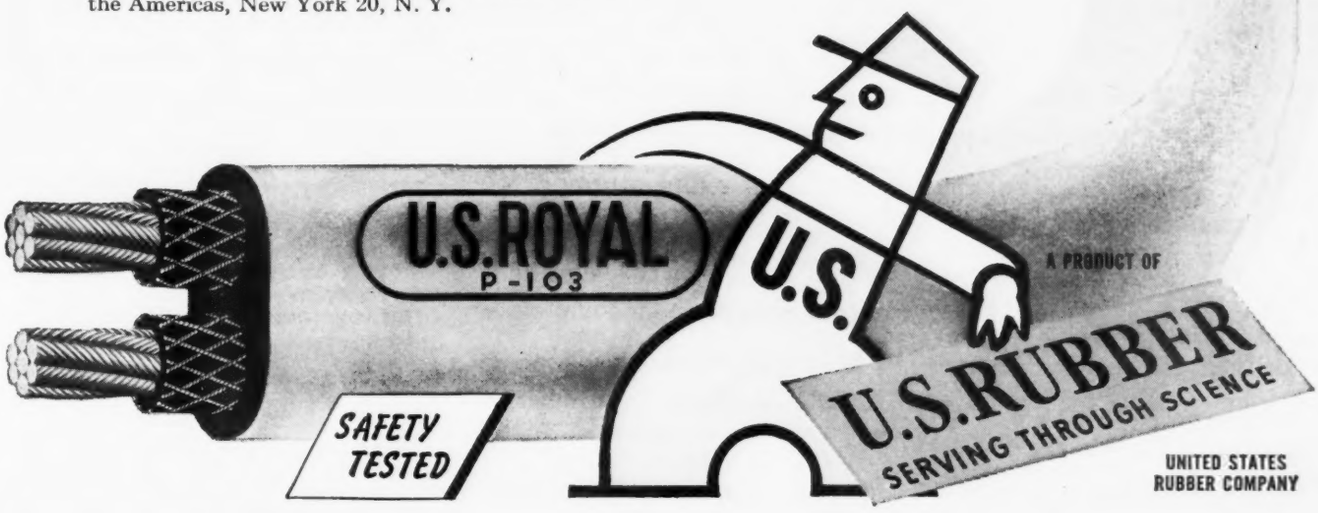
MORE SAFETY—U. S. Royal Cables are now available in golden yellow for higher visibility.

MORE SAFETY—The golden yellow jacket is made of tough *pressure-cured* Neoprene—highly resistant to abrasion, cutting, heat, moisture, and oil. Beneath jacket, a strong cotton braid covers the insulation.

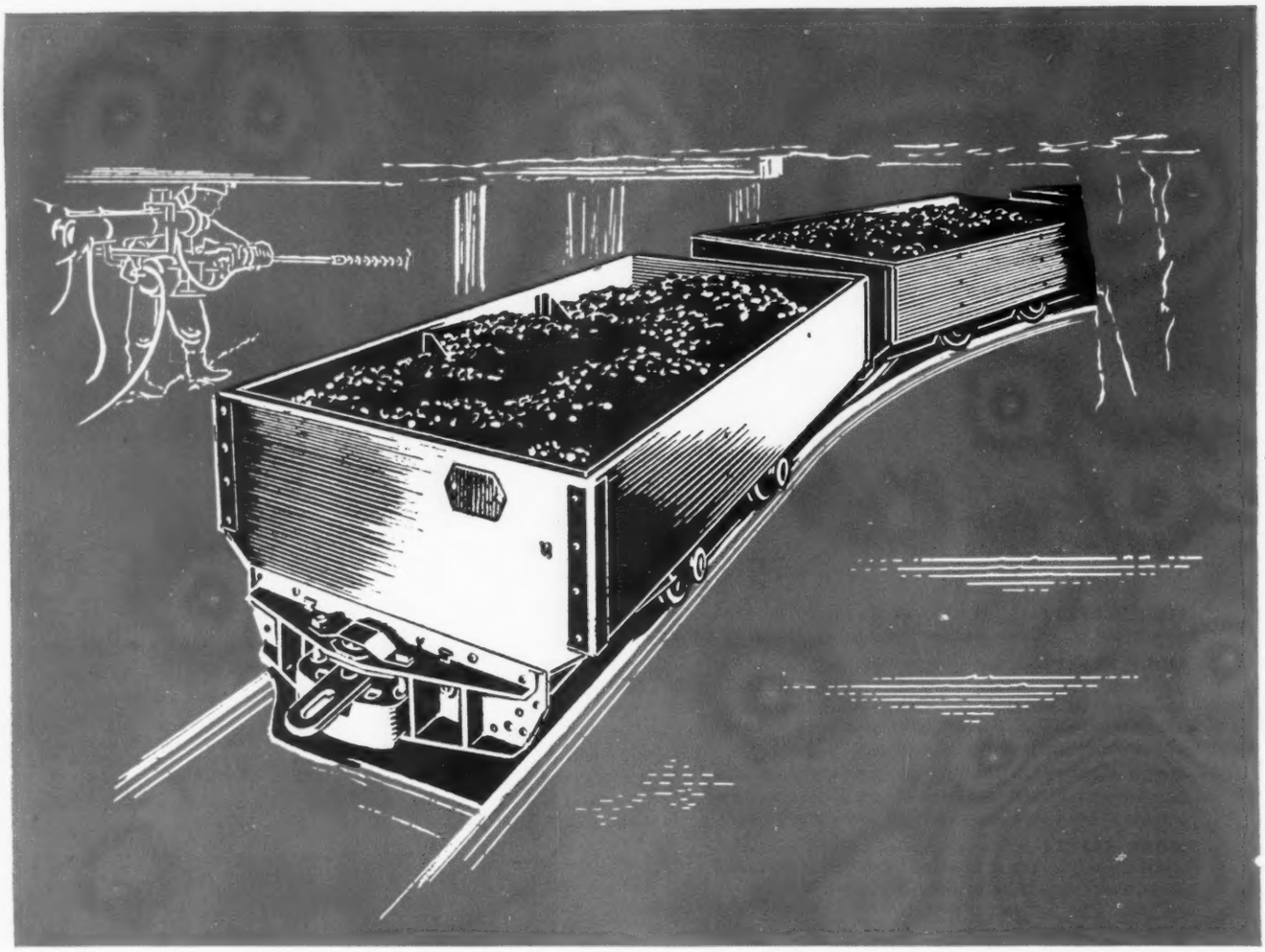
MORE SAFETY—U. S. Royal Gold Cables have insulation of the finest rubber compound, with a tensile strength as high as 1400 pounds per sq. in.

MORE SAFETY—The conductors are of annealed coated copper, the stranding of which is designed *specifically* for mining machine and locomotive cables. The copper insures top physical and electrical qualities and the greatest possible flexibility and efficiency.

MORE SAFETY—U. S. Royal Gold Cables must pass 7 rigorous "torture" tests before being approved as safe enough for your toughest jobs. They also bear the label P-103, given by the Pennsylvania Department of Mines in token of U. S. Royal's conformity with their strict fire prevention regulations. Write for free sample and booklet to United States Rubber Company, Wire and Cable Department, 1230 Avenue of the Americas, New York 20, N. Y.



YES! Tycol Akup and Acylkup Mine Car Greases perform better . . . BETTER . . . BETTER



Tycol Mine Car Greases perform better because:

. . . *Tycol Mine Car Greases* are engineered from specially selected cylinder oil stocks, expertly blended with calcium soap to assure long bearing life.

. . . *Tycol Mine Car Greases* exhibit minimum penetration changes, permitting application in and out of the mine.

. . . *Tycol Mine Car Greases* reduce low temperature drag—more cars per haul.

. . . *Tycol Mine Car Greases* retard lubricant leakage at high temperatures—furnish lower output costs per pound of grease.

For more information about Tycol Mine Car Greases write, wire, or phone your nearest Tide Water Associated Office.

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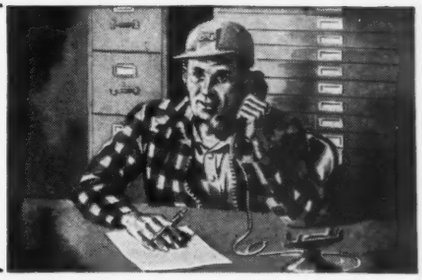
News Round-Up



Synthetic-Fuels Program Gets Three-Year Funds

President Truman Mar. 15 approved legislation extending for another three years the nation's five-year program adopted in 1944 for development of synthetic fuels and providing for an additional appropriation of $30,000,000. The program will seek to develop processes by which oil can be made from coal and lignite, oil shale and coal gas. A fourth project, making oil from natural gas, is well under way by the oil industry.

First results of the added funds will be construction this summer of a $4,413,250 coal-gas synthesis demonstration plant at Louisiana, Mo., the contract for which was awarded to the Koppers Co., Inc., Mar. 29. Other research centers include: a $7,000,000 coal hydrogenation plant at Louisiana, Mo., near completion; a $3,500,00 laboratory and pilot plant at Bruceton, Pa., to be dedicated May 21; an oil-shale reduction plant at Rifle, Colo., completed last May at a cost of $1,500,000 and now being expanded; an oil-shale retorting plant at Laramie, Wyo., completed last year; and a synthesis-gas laboratory at Morgantown, W. Va.

Fuel Gas to Be Made From Anthracite Silt

A huge new source of fuel is expected to be made available in coming months by a new process for converting millions of tons of anthracite silt into fuel gas, Frank W. Earnest, Jr., president of the Anthracite Institute, announced last month. In another form the gas produced from a hitherto waste anthracite material will provide synthetic petroleum products and chemical synthetics, such as ammonia and methanol.

About 200,000,000 tons of anthracite silt is immediately available for such conversion. Large additional resources for gas conversion can be anticipated yearly because 10 percent of the annual production is silt. The revolutionary new process, related to the German method for gasifying brown coal, has been the subject of experiments at the Anthracite Institute laboratories in Wilkes-Barre, Pa.

Anthracite silt, according to Dr. Raymond C. Johnson, vice president in charge of research of the Anthracite Institute, is an excellent fuel for the production of these gases because "it is non-coking, free of tar, has a low sulphur content and a high ash-fusion temperature." It can be processed into three gases, the first two of which are fuel gases.

Cruse Named to Head Illinois Mine Bureau

Robert R. Cruse of Dowell, Ill., actively engaged in the mining industry in Illinois for 45 years, was appointed Feb. 26 director of the Illinois Department of Mines and Minerals, succeeding the late Thomas Moses.

Mr. Cruse, who is 64 and a lifelong resident of Southern Illinois, has had extensive experience in all phases of mining, as both an official and a miner. He began work in the mines as a mule driver and for 10 years was employed in various underground jobs in mines of Williamson, Jackson and Saline Counties.

In 1910 he was promoted to manager of the Cambria mine of the Carter-ville & Big Muddy Coal Co. and held that position until 1919. For the next 10 years he was manager of the Western Coal Mine Co.'s mine at Bush. In 1929 he became mine manager and assistant superintendent of the Dowell mine of the Union Colliery Co. of St. Louis, one of the largest mines in Illinois, producing more than 1,000,000 tons annually and employing over 600 men. He held these posts until the Dowell mine was closed by its operators in February, 1947.

To Our Readers And Advertisers

UNSETTLED RELATIONS between printers with whom we deal and certain of their employees have forced us to use some substitute methods in producing this issue. The results of these deviations from normal may be visible to you. If the printing emergency persists, we may have to resort to still more apparent substitutes. But we intend to let nothing which we can now foresee stop us from bringing to you full-length, clear and typographically pleasing issues.

Pension Developments

Mar. 12—In letter to U. M. W. A. officials and members, Lewis charges operators "dishonor" contract in delay by setting up pensions; asks men to "discuss the matter" and promises further word.

Mar. 15—Miners begin to stay away from work; within several days, industry entirely closed down except for isolated areas and non-U. M. W. A. workers.

Mar. 16—Ezra Van Horn replies to Lewis, charging: (1) Lewis foments strike to circumvent Taft-Hartley Act; (2) $100 monthly pension asked for all miners over 60 with 20 years service not legal since men already retired not eligible under Taft-Hartley Act; (3) Fund insufficient to include all men as sought by union; (4) Lewis had ignored two actuarial studies; (5) Lewis had refused to permit investment of accumulated funds, cooperate in appointing neutral trustee or continue study of plan.

Mar. 18—Government orders, effective Mar. 21, a 25 percent cut in coal-burning railroad passenger service and bans coal exports; 25 percent cut in coal-burning freight service later ordered, effective Mar. 30.

Mar. 22—Government's proposal that miners return to work and that findings of a three-man board agreed on by the union and operators be the basis for settlement accepted by operators but rejected by union.

Mar. 23—President Truman invokes Taft-Hartley Act, setting up three-man board of inquiry to report by April 5. Under the law, an 80-day injunction could be sought by the government after the fact-finding board makes its report.

Mar. 30—Lewis testifies before inquiry board in compliance with order issued by Federal District Court after board's subpoena had been ignored; failure to appear would have subjected him to contempt proceedings.

April 12—Lewis announces "contract honored," after he and Sen. Styles Bridges (newly agreed-on neutral trustee) agree on $100 monthly pension at age 62, with Ezra Van Horn dissenting. Lewis still to stand trial April 14 for contempt of court in ignoring earlier court order directing him to order miners back to work. Miners begin to return to pits, some holding out, however, to await outcome of contempt trial.

U. S. Bureau of Mines Photo

Dan Harrington Retires

DAN HARRINGTON, widely known for many years throughout the industry for his pioneering work in mine safety and health, retires this month as chief of the Health and Safety Division of the U. S. Bureau of Mines —a position he has held since 1935. He has been in this work with the Bureau since 1914 and for 14 years before joining the Bureau he worked as an engineer and superintendent with various mining companies, chiefly coal operations. He is a graduate of the Colorado School of Mines and a native of Colorado.

Mr. Harrington has participated in rescue and investigation work in nearly 100 mine disasters. One of the first to recognize the explosion dangers inherent in bituminous coal dust (as early as 1900), Mr. Harrington has participated in experimental work and written numerous articles on dust control. In 1915, while serving as district engineer in Denver, he prepared a comprehensive report on the first rock-dusting program initiated in the United States.

Throughout his long association with the Bureau, Mr. Harrington has carried on intensive studies of methods of combating silicosis in the mineral industries. In addition to these studies, Mr. Harrington has contributed articles to technical and scientific journals on the use of permissible explosives in coal mines, mine ventilation, prevention of electrical accidents, and many other subjects relating to the reduction of accidents and ill-health in the mineral industries. He is also the author of scores of publications on health and safety issued by the Mines Bureau over many years.

In 1942, shortly after the United States' declaration of war upon the Axis powers, the administration of the Federal Explosives Act was placed in the Health and Safety Division of the Bureau under the supervision of Mr. Harrington. The effectiveness of the administration of the Act is evinced by the fact that, although hundreds of millions of pounds of explosives were consumed by American industry during the 3½ years of the United States participation in World War II, not one clear-cut case of sabotage involving explosives was reported to the Bureau. During this period Mr. Harrington also directed the activities of the Mineral Production Security Division, and the health and safety work of the newly organized Coal Mine Inspection Division and the long-established Safety Division.

Mr. Harrington is affiliated with many professional and scientific organizations. They include the A.I.M.E., Mine Inspectors Institute of America, National Safety Council, Rocky Mountain Coal Mining Institute, Coal Mining Institute of America, National Mine Rescue Association, American Standards Association, Federal Fire Council, National Fire Waste Council, and the Interdepartmental Safety Council. He is a member of more than 30 committees devoted to the advancement of health and safety, and for more than 20 years has been the secretary of the Joseph A. Holmes Safety Association, as well as secretary of the Mining Section of the National Safety Council and editor of the News Letter issued by the Mining Section. For several years he has served as chairman of the Mining Correlating Committee of the American Standards Association. He lives at 1400 South Barton St., Arlington Village, Arlington, Va., where he will continue to reside after retirement.

•

Eastern Kentucky Group Holds First Meeting

The first meeting of the recently formed Eastern Kentucky Electrical and Mechanical Institute was held at the Lakeside Hotel, Jenkins, Ky., March 8. Sixty persons from Eastern Kentucky and neighboring Virginia, representing 15 different companies, were present to hear C. E. Hugus Jr., field engineer, Reliance Electric & Engineering Co., Cleveland, discuss the application of motors on mechanical loading equipment, after which the meeting was thrown open for a discussion of the many and varied mechanical and electrical problems of mutual interest. Those present were dinner guests of Consolidation Coal Co. (Ky.).

A preliminary meeting of the group was held on Feb. 18, when George Leatherman, Inland Steel Co., Wheelright, Ky., was named acting chairman, and Lee Siniff, Consolidation Coal Co. (Ky.), Jenkins, was named acting secretary. Permanent officers will be elected at the next meeting. Meetings will be held monthly and members are being enrolled. Many of the leading coal companies in the field are working to make the institute a success.

•

Kentucky House Passes New Strip Law

Voting 49 to 20, the Kentucky House of Representatives on March 2 passed and sent to the Senate a bill to regulate stripping by requiring operators to fill in stripped areas but not requiring them to reforest or plant them to grass seed. The bill as passed was less stringent than the original bill, which would have required reforesting or seeding, but it does require strip operators to register with the State Department of Mines and Minerals and to report on the scope of their operations. Penalty for failure to comply is a $5,000 fine, payable to the county in which the operation is located.

Earlier, in February, a bill was put into the legislative hopper to levy a tax of 10c. a ton on stripped coal. The proposal was introduced by C. B. Embry, Beaver Dam, Ky., a state senator.

In addition, the Kentucky legislature received a favorable committee report on a bill to create an advisory board to the State Department of Mines and Minerals, to be named by the governor and to consist of three coal operators and three experienced miners.

DAD . . These CINCINNATI CHAINS BITS and BARS are TOPS!

SON, They don't make any better . . we've used them since I was a lad.

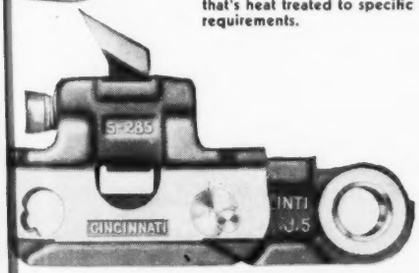
CINCINNATI SPROCKET

Made of high grade alloy steel. Sturdily constructed for long, lasting service.

CINCINNATI DUPLEX CHAIN

The Cincinnati Duplex Chain with the Duplex Bit is recommended for maximum cutting efficiency. The block and connector are drop forged of high grade alloy steel, carefully heat treated and scientifically engineered to withstand hard usage.

Made for exclusive use in Cincinnati Duplex Chains. A double ended, reversible, low cost long life bit that's heat treated to specific cutting requirements.



CINCINNATI STANDARD CHAIN

Similar in design to the DUPLEX . . . accomodates either standard mine sharpened bits or the popular Stanex Holder and Bit.

STANEX MOUNTING

Combination of strong durable holder and Stanex reversible Double Ended Bit to fit Cincinnati Standard Chain or other standard chains.

CINCINNATI CUTTER BAR

Cincinnati Bars are specially designed to operate under all cutting conditions and with all types of cutting machines.

IT MAKES no difference whether he's a new man on cutting operations or whether he's an old timer . . . the ruggedness and superior efficiency of Cincinnati Coal Cutting Equipment is always recognized. For over twenty-five years, The Cincinnati Mine Machinery Company and its personnel have been devoting their energies and engineering abilities to building better coal cutting equipment. Briefly, Cincinnati Chains and Bits use less power . . . cut faster . . . increase production . . . make coarser cuttings and decrease maintenance costs. They are preferred by mine operators . . . by men in the cutting rooms and by maintenance men. Let one of our representatives talk to you about the advantages of Cincinnati TIME TESTED Coal Cutting Equipment.

THE CINCINNATI MINE MACHINERY CO.

2983 SPRING GROVE AVENUE • CINCINNATI, OHIO

RED JACKET DINNER honored foremen sitting at the right. At the speakers' table, left to right: G. A. Reilly, consulting engineer; W. M. Ritter, general manager; J. J. Plasky, training director; J. F. Maurice, chief engineer; E. L. Chatfield, West Virginia Department of Mines; E. G. Otey, director; and F. B. McChesney, treasurer.

SAFETY CHAMPS line up for a picture in the ballroom, where dinner was served to 200 company officials and guests.

RED JACKET HONORS SAFETY WINNERS

Two hundred officials of the Red Jacket Coal Corp. and their guests met at a dinner in Bluefield, W. Va., Jan. 31, to honor 47 foremen with perfect safety records in 1947 and 10 with perfect records for two years. The two-year men were presented with gold certificates for having no lost-time accidents in their sections by E. L. Chatfield, inspector-at-large, West Virginia Department of Mines. Other certificates, as well as the title "Master of Safety," went to foremen with a one-year record. Men in these two groups supervised the mining of 591,822 tons of coal without a single accident necessitating the loss of one working day.

Forty-two other foremen, who had one or more accidents but cleared their record under the company's merit system, in addition to those with perfect records, were given white hard hats to mark their accomplishment by J. J. Plasky, training director. William M. Ritter, general manager, commended employees and management of the Wyoming mine for establishing the best safety record in the company, and presented to Lee Haga, superintendent, a trophy in recognition of their achievement. The trophy, awarded annually to the mine having the best safety record within the company, may be held permanently by any group that wins it for three consecutive years. The meeting was opened by Roy A. Islon, assistant general manager, who introduced J. F. Maurice, chief engineer, who acted as toastmaster.

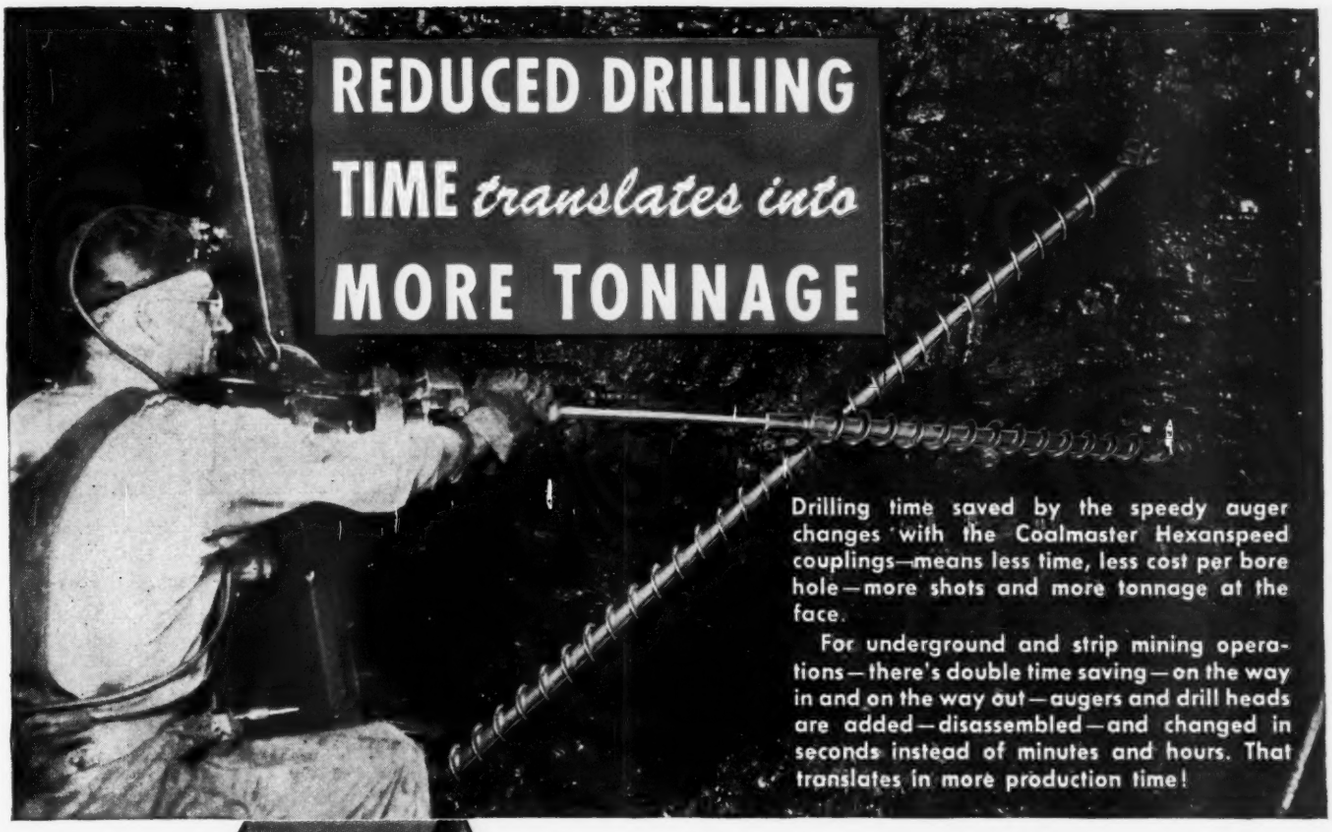
Foremen with perfect safety records are shown in the lower photograph. Two-year men present are noted with an asterisk. Left to right: seated—J. Carl Cook,* Junior mine; Frank Melmige, Junior; Mike Ferrell, Coal Mountain; Harry West, Keen Mountain; Ward Blankenship, Coal Mountain; Anse Kennedy, Junior; Roy Short, Wyoming; Clyde Hammond, Junior; and Light Hatfield, Coal Mountain. Second row—Lewis Simpkins, Junior; Byron Ball, Junior; Norman Pressley, Keen Mountain; E. M. Tolliver,* Wyoming; D. W. Halstead,* Wyoming; H. B. Artis, Mitchell Branch; Ernest Jessie, Coal Mountain; Carl Mace,* Wyoming; G. E. Ritter, Mitchell Branch; Arson May, Mitchell Branch; Okey Tiller,* No. 6; Roy Thompson,* Keen Mountain; Hubert Thomas, Wyoming; John Hagerman, Wyoming; A. W. Cook, Wyoming; M. M. Gunter, Wyoming; and G. A. Neal, Wyoming. Back row—Lewis Hardesty, Junior; Raymond Woodward, No. 6; Lonnie Hamby, Mitchell Branch; and Jones Kennedy, Junior.

•

Shape Plans for School In Anthracite Stripping

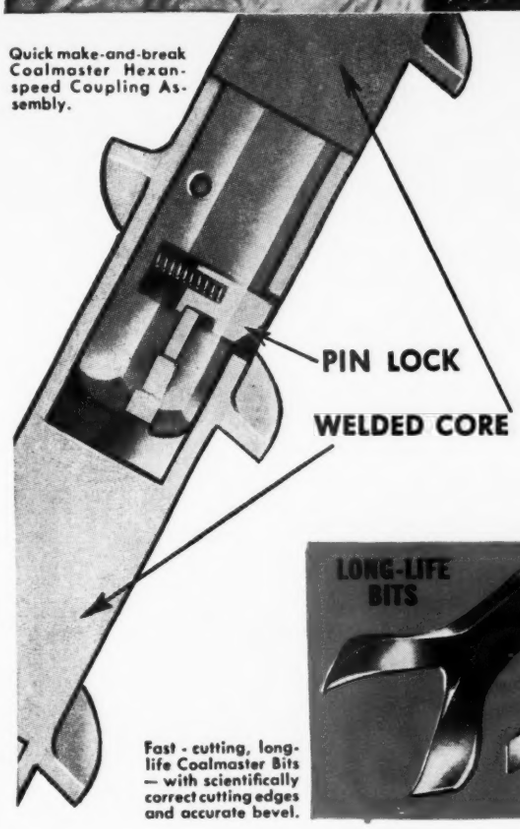
Classes in land rehabilitation for anthracite stripping operators will be set up for the summer of 1948, according to announcement recently by J. N. Morton, chief, Forest Management Division, Pennsylvania Forests and Waters Department. Stressing additional problems confronting anthracite operators because of deeper workings and bigger spoil banks than in bituminous stripping, Mr. Morton declared that the recent bituminous school at Kittanning, Pa., (*Coal Age*, March, 1948, p. 150) would serve as a pattern on which the anthracite school would enlarge. The school probably will be held in Kingston, Pa.

REDUCED DRILLING TIME *translates into* MORE TONNAGE



Drilling time saved by the speedy auger changes with the Coalmaster Hexanspeed couplings—means less time, less cost per bore hole—more shots and more tonnage at the face.

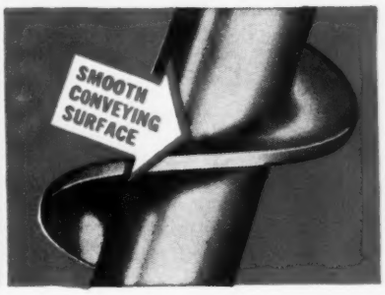
For underground and strip mining operations—there's double time saving—on the way in and on the way out—augers and drill heads are added—disassembled—and changed in seconds instead of minutes and hours. That translates in more production time!



Quick make-and-break Coalmaster Hexanspeed Coupling Assembly.

Here's the time-saving, efficient Coalmaster Hexanspeed coupling in phantom view—to show the quick make-and-break feature that streamlines drilling operations. The hex shank with its pin-lock snaps right into the snug fitting hex socket—and the Spir-L-Weld flight of Coalmaster augers automatically fits flush and unbroken—on both drill head and auger couplings.

Fast-cutting, long-life Coalmaster Bits—with scientifically correct cutting edges and accurate bevel.



Coalmaster Auger—Spir-L-Welded for reduced flight drag and faster conveying.

DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT COMPANY

ST. LOUIS 15, MO.

AUSTIN POWDER COMPANY, Cleveland, Ohio • BALIMO, LTD., London, England • BRITISH-AMERICAN INDUSTRIES, LTD., New York City, New York • THE BUDA COMPANY, Harvey, Illinois • DIAMOND SUPPLY COMPANY, INC., Evansville, Indiana • DOOLEY BROTHERS, Peoria, Illinois • ILLINOIS POWDER MFG. CO., St. Louis Missouri; Denver, Colorado; Salt Lake City, Utah • JOY MANUFACTURING COMPANY, Main Office: Pittsburgh, Pa., Subsidiaries and representatives in 57 countries • SALEM TOOL CO., Salem, Ohio

AT THE MINING ELECTRICAL GROUP meeting, left photo: Mel Sloan (left), vice president, M. E. G.; J. E. Bragdon, sales engineer, Southern Illinois, and J. J. Slomer, hydraulic engineer, Goodman Mfg. Co., Chicago; and W. J. Jenkins II, secretary, M. E. G. Right photo: visiting officials of the Indiana Mining Electrical Group are F. J. Gallagher (left), program chairman; Roy Pugh, secretary-treasurer; and H. S. Banholzer, president.

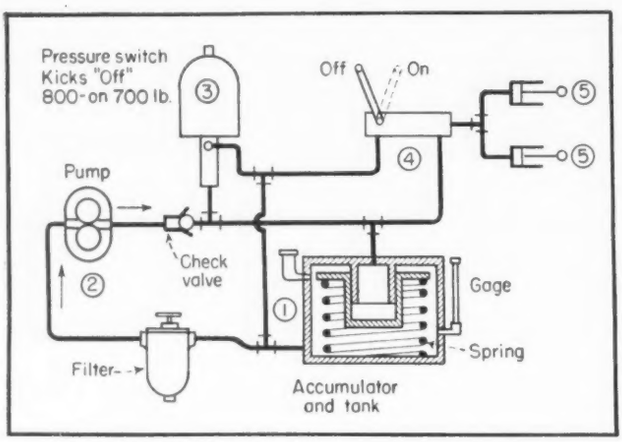


FIG. 1—LAYOUT of a closed system using an accumulator.

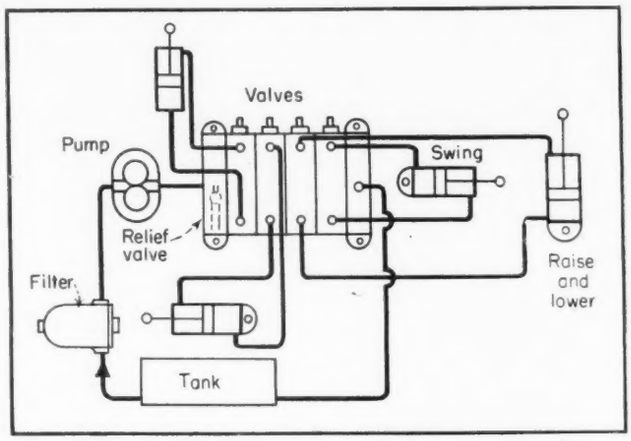


FIG. 2—LAYOUT of an open-circuit hydraulic system.

Hydraulic Controls Discussed By Mining and Electrical Group

HYDRAULICS is the science that deals with the study of the flow of liquids, which may be either static or dynamic, said J. J. Slomer, hydraulic engineer, Goodman Mfg. Co., in discussing the topic "Hydraulic Control of Mining Equipment," before the 105th meeting of the Mining and Electrical Group, West Frankfort, Ill., March 4, 1948.

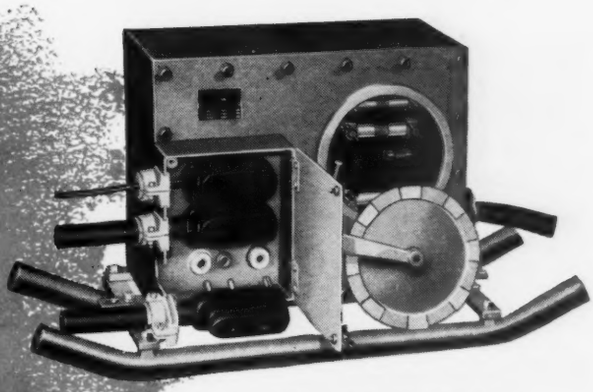
The year 1920 was the starting point for what he termed "Industrial Hydraulics." A revolution in hydraulics has taken place, Mr. Slomer declared. He credited the development of hydraulics to the improvements in pumps, hydraulic motors, flexible tubes and hose, improved valves to control the circuits, better finishes on the parts, closer tolerances, and better oils for the fluids, all of which having made possible the advances in industrial hydraulics. The chevron packing and the "O" ring packing have made it possible to seal pressures heretofore thought impractical.

Mr. Slomer differentiated between "Hydraulics" and "Industrial Hydraulics" as being the difference between large volumes at low pressure (as with weirs, dams, canals, and water systems), and the use of small volumes at very high pressures (as in the control of a loading machine, etc.). In the former, water is almost always the liquid involved, while the latter most frequently uses oil that may be inhibited from oxidation, foaming, and sludging, while still retaining its lubricating qualities. Industrial hydraulics, he declared, may well be termed the science of the transmission of power hydraulically for driving motors and for controlling the movements of the machines that may be driven electrically or by other means. In some systems the pressure may go as high as 3,000 lb. per square inch for intermittent service; and for rivet-setting presses and some hydraulic lifts the pressures may be as high as 10,000 lb. per square inch.

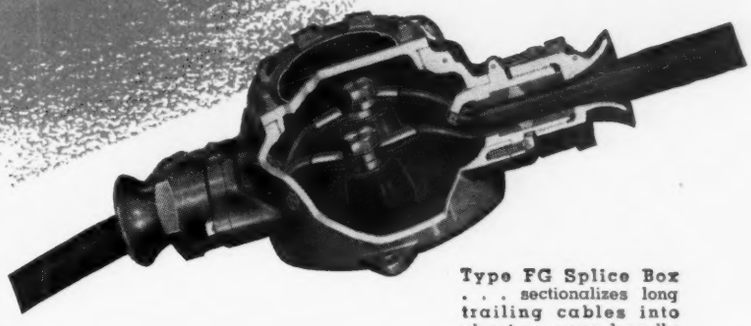
Two primary circuits or systems are used in industrial hydraulics, namely: the closed system; and the open system. When the fundamentals of both circuits are understood, hydraulics may be applied to any type of equipment, he said. A simple layout for a closed system (Fig. 1), such as would be used with operating the hydraulic brakes of a locomotive, consists of the following: (1) oil tank; (2) small-volume, high-speed pump powered by a small high-speed electric motor; (3) pressure-unloading valve or pressure switch to stop the pump motor after the accumulator has been filled; (4) brake control or pressure-reducing valve; (5) brake cylinders.

To operate this circuit, the oil comes from the pump and goes to the accumulator, a device constructed of a piston and cylinder which pushes against a heavy spring. As the pressure is increased, the cylinder is com-

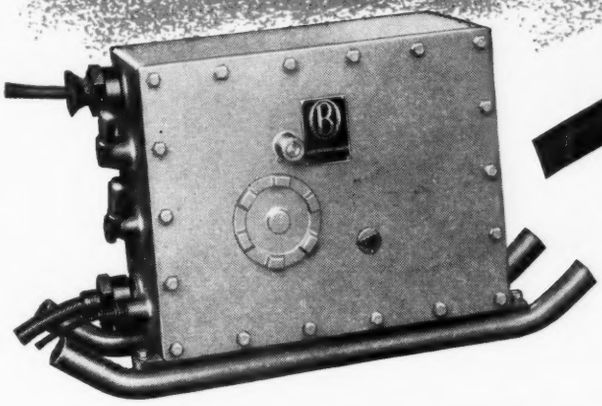
TO KEEP TONNAGE MOVING IN GASEOUS AREAS



Type LG Distribution Box . . . offers safe connection facilities for three branch circuits, each individually fused.



Type FG Splice Box . . . sectionalizes long trailing cables into shorter, easy-handle lengths.



Type BDG Motor Starter . . . provides complete control plus overload protection for conveyor, pump, fan and compressor motors.

. . . Distribute Power Through O-B Gas-Proof Control Equipment

Here is a trio of production-boosting devices that can help you stop electrical "slow-downs" in gaseous working areas. Each is designed to serve a necessary function in power handling at the face . . . the Type BDG Motor Starter to control and protect conveyor drives; the Type LG Distribution Box to provide three individually-fused branch circuits; and the Type FG Splice Box to sectionalize long, hard-to-handle trailing cables into shorter, easy-to-manage sections.

All three devices have been mine-engineered by men familiar with mine operating requirements. All have been explosion tested by the U.S. Bureau of Mines and APPROVED—the distribution and splice boxes as complete permissible units; the motor starter as being suitable for use with permissible equipment.

Why be satisfied with less? Install the best! Intrust your vital power lifeline to O-B Gas-Proof Control Equipment.

2838-M

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario

Shorts, overloads and other faults in your mine electrical distribution system can cause costly damage to machinery and tumble your production schedule. That's why you should sectionalize your trolley and feeder circuits with I-T-E Type KSC Automatic Reclosing Circuit Breakers.

When a fault occurs, the KSC automatically opens, and recloses only when the fault has been corrected. It isolates the affected area to prevent interruption of production in other areas. This cuts lost time to a minimum—contributes to higher production.

As shown in the diagram above, a disconnect switch or protective device should be placed in every power line at not over 1500 foot intervals. An overcurrent protective device should be used in each circuit leaving a substation. These can be fuses or circuit breakers of the manual or the automatic reclosing type. (If circuit breakers are employed, trip free operating mechanism should be used.) The exception to this is where a substation feeds the main haulage only and only one haulage unit at one time. In this case only one breaker is required at the station.

There are other important applications—too numerous to mention here. Full details can be obtained by contacting the I-T-E Mining Specialist in your neighborhood. He will be glad to make an application analysis of your electrical distribution system. So use him—at no obligation.

Be Wise **SECTIONALIZE**

I-T-E Circuit Breaker Company

19TH AND HAMILTON STREETS, PHILADELPHIA 30, PA.

(2ND OF A SERIES ON RECOMMENDED SECTIONALIZING PRACTICE USING THE KSC)

I-T-E **SECTIONALIZING** *Switchgear*

MEETINGS

- American Mining Congress: annual coal convention, April 26-28, Netherland Plaza Hotel, Cincinnati, Ohio.
- Sixth Annual Anthracite Conference at Lehigh University: May 6-7, Bethlehem, Pa.
- Canadian Coal Operator's Assn.: annual meeting, May 10, Ottawa, Ont.,
- American Coal Sales Assn.: annual meeting, May 19-22, Greenbrier Hotel, White Sulphur Springs, W. Va.
- Mine Inspectors Institute of America: annual convention, June 7-9, Neil House, Columbus, Ohio.
- West Virginia Coal Mining Institute: spring meeting, June 11-12, Black Knight Country Club, Beckley, W. Va.
- Stoker Manufacturers Assn.: annual meeting, June 17-19, Greenbrier Hotel, White Sulphur Springs, W. Va.

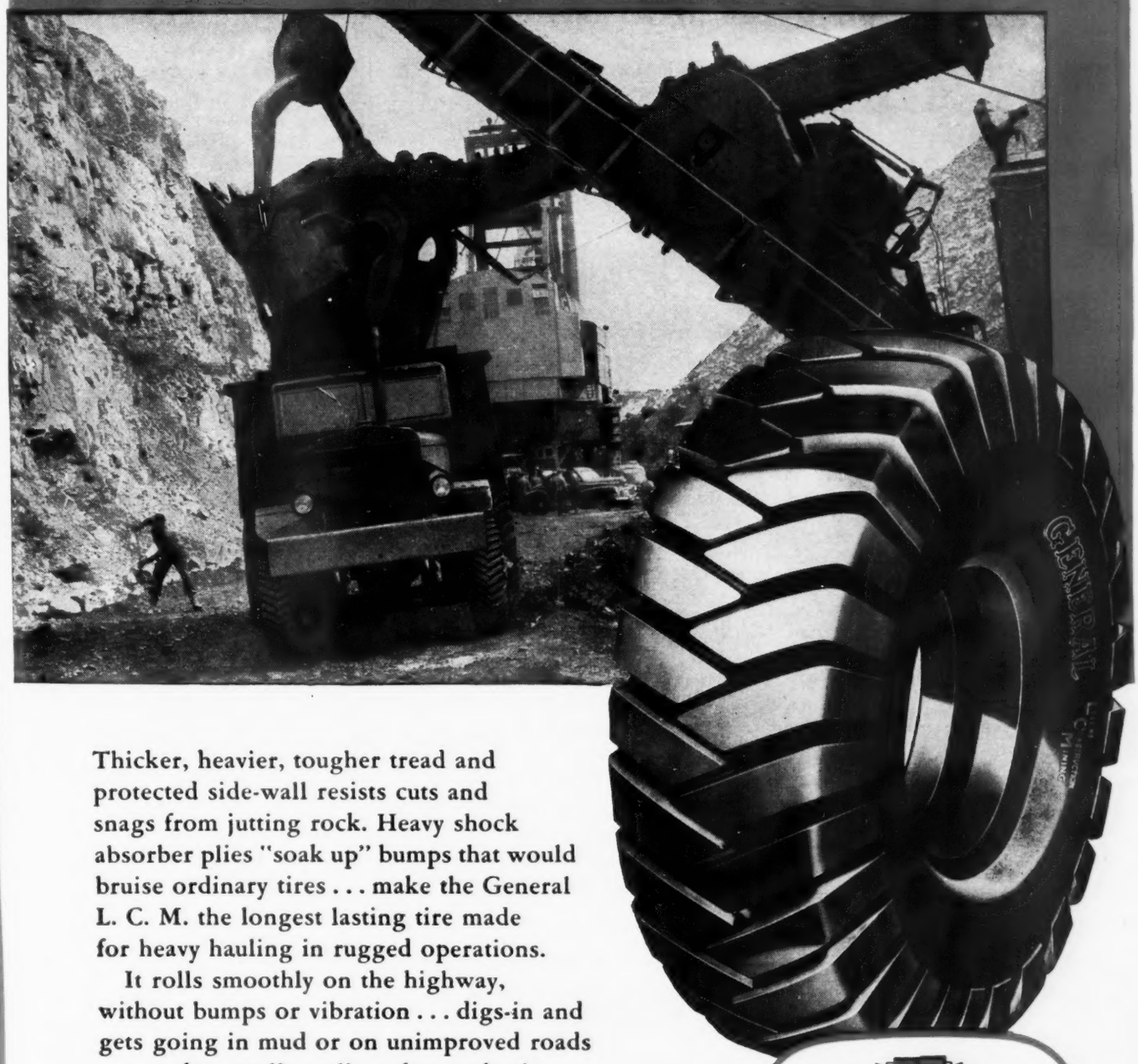
pressed until the unloading valve or the pressure switch operates to shut off the flow of oil from the pump when the system is fully charged. Thus, the accumulator acts as a power reservoir, even though the electric power should fail. In this system the pressure switch stopped the pump when the pressure in the accumulator reached 800 lb. per square inch. The brake control valve is designed with a certain area of piston, and when using the correct springs the pressure selected was 500 lb. per square inch as this is satisfactory for operating the pistons of the brake cylinder so as to obtain the correct braking effort. Thus, there is some margin between the fully charged valve and the braking pressure for the control valve. When the brakes are released the oil is bled off at the brake control valve and returned to the oil tank. This makes the system a closed system, preventing dirt entering or oil loss.

For closed systems using pressures as high as 3,000 lb. per square inch, a nitrogen-filled accumulator with rubber diaphragms has been used. However, because of the leakage of nitrogen through the diaphragm it may be necessary to recharge the accumulator with nitrogen or replace the diaphragm in six to eight months. Recharging is not necessary where a spring-type accumulator is used, as the springs store up the energy when pressure is applied.

In the open-circuit system (Fig. 2), a somewhat more complicated circuit may be used, as there are available multiple units of valves for controlling various movements, such as raising and lowering, swinging both conveyors, and tramming. Working pressures up to 1,500 lb. per square inch in this system and the back-pressure on the return line usually ranges from 24 to 75 lb. per square inch. Vane-, gear-, and piston-type pumps are employed to furnish the oil pressure. The

WHEN YOU'RE CUTTING MINING COSTS
GET TIRES THAT STRIP BEDS CAN'T CUT!

THE GENERAL L.C.M.



Thicker, heavier, tougher tread and protected side-wall resists cuts and snags from jutting rock. Heavy shock absorber plies "soak up" bumps that would bruise ordinary tires . . . make the General L. C. M. the longest lasting tire made for heavy hauling in rugged operations.

It rolls smoothly on the highway, without bumps or vibration . . . digs-in and gets going in mud or on unimproved roads . . . works equally well on front wheels, power wheels or free-rolling wheels.

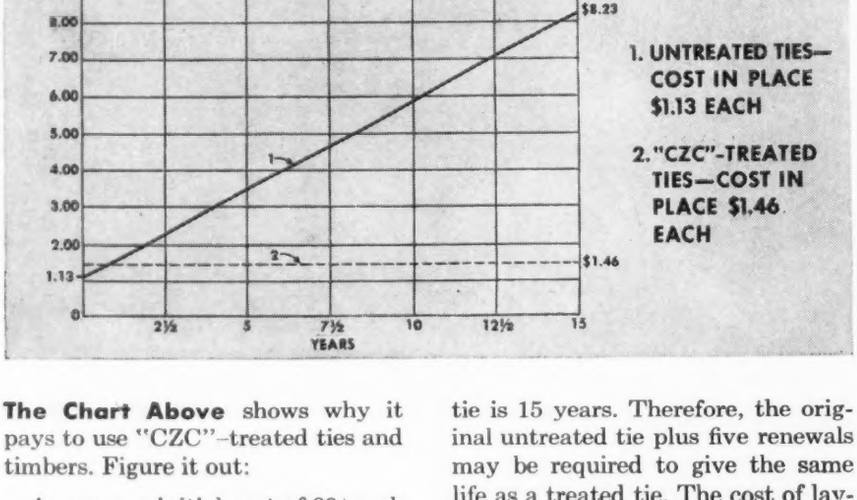
The GENERAL L.C.M.

THE GENERAL TIRE & RUBBER CO. • AKRON, OHIO

"CZC"-

TREATED TIES COST LESS!

Compare the costs of treated and untreated ties over a period of 15 years!



The Chart Above shows why it pays to use "CZC"–treated ties and timbers. Figure it out:

Assume an initial cost of 89¢ each for "CZC"–treated ties, and the initial cost of an untreated tie at 56¢. Total cost of installing an untreated tie—including delivery underground (estimated at 6¢) and labor cost for placing and spiking (at 51¢)—is $1.13. Using these same figures, the cost of installing a "CZC"–treated tie is $1.46.

Cost of Renewal High

The estimated life expectancy of an untreated tie is 2½ years, and the minimum life of a "CZC"–treated tie is 15 years. Therefore, the original untreated tie plus five renewals may be required to give the same life as a treated tie. The cost of laying a renewal tie, including spiking, removal and disposal of old ties, is estimated at 80¢ each.

Over a 15-year period, the cost of using untreated ties is $8.23 per unit, compared with $1.46 per unit for "CZC"–treated ties. The saving is even bigger if interest charges are applied on the investment.

For details write E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wilmington 98, Delaware.

DU PONT CZC

Chromated Zinc Chloride

WOOD PRESERVATIVE

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

EQUIPMENT APPROVALS

Eight approvals of permissible equipment were issued by the U. S. Bureau of Mines in February, as follows:

Mines Equipment Co.—Type PGGGG junction box; four branch circuits, 500 volts, d.c.; Approval No. 598A; Feb. 18.

Joy Mfg. Co., Sullivan Division—No. 7 core drill; 7½-hp. motor, 230 volts, d.c.; Approval No. 2-606; Feb. 3.

Joy Mfg. Co., Sullivan Division—Size 3x4-in. Simplex pump; 5-hp. motor, 230 volts, d.c.; Approval No. 2-607; Feb. 3.

Goodman Mfg. Co.—Type 812-EJH shortwall mining machine; 50-hp. motor, 230 and 500 volts, d.c.; Approvals Nos. 2-608 and 2-608A; Feb. 9.

Joy Mfg. Co.—Type PL11-5PKK elevating conveyor; 7½-hp., a.c. motor, 550 volts, three phase, 60 cycles; Approval No. 2-609A; Feb. 11.

Joy Mfg. Co.—Types T12-1D and T12-2D trucks; 5-hp. motor, 90 volts, d.c., battery-operated; Approval No. 2-610. Feb. 17.

Lee-Norse Co.—Type MT6 mine grease truck; 7½-hp. gear motor and 3-hp. pump motor, each 250 volts, d.c.; Approval No. 2-611; Feb. 11.

Jeffrey Mfg. Co.—Class 47 distribution box; two or three branch circuits, 250 and 500 volts, d.c.; Approvals Nos. 2-612 and 2-612A; Feb. 27.

gear-type pump is the cheapest to manufacture, and because of its file-hard gears it has a relatively long service life. However, this type pump, because of clearances necessary to operate, is not suitable for working pressures in the 3,000 lb. per square inch range.

The piston-type pump is suitable for high pressure operation, and with the file-hard piston 62 or 63 Rockwell hardness it is able to give a long service life. The vane-type pumps have internal parts which are equally as hard as the other two types, but the maximum working pressures usually recommended are about 1,000 lb. per square inch. The hydraulic system of control has been made possible because metal parts may now be made file-hard out of material which is wear resistant, and when wear is found it usually results from the lack of cleanliness of the oil, and also some scoring due to dirt, grit, and coal getting into the system through carelessness when adding oil or making repairs to the parts or piping.

Among the points to be kept in mind in operation of a hydraulic system, Mr. Slomer pointed out, are:

1. Guarding against contamination of the hydraulic fluid;

2. Avoiding scratching of the metal surfaces;

3. Not permitting use of hammer and chisel for prying apart pumps,

Why You Cannot Get Ahead As Your Father Did —

THE UNITED STATES is being forced toward socialism by a tax revolution of far-reaching consequences.

We have not yet felt fully the deadly impact of this revolution because inflation and the postwar boom have delayed its effects.

But from now on, more and more people will feel its bite. Already it is the dominant element in our economic life. Already it is the major factor in our chances of keeping our jobs and of getting ahead.

Here are some pertinent facts on this tax revolution:

1. The tax load that our nation can safely carry has long since passed the danger point.

Our capitalistic system is in real danger when taxes take more than 20 percent of our national income (or 20¢ out of every income dollar). Beyond that point there are not sufficient dollars left in private hands for capitalistic America to raise the capital required to keep its industry going. So we are right now being nudged further and further into socialism.

For today taxes take *twenty-five* percent of national income (or 25¢ out of every income dollar).

2. The tax revolution has undercut the incentives that help us to get ahead.

The group whose incomes range from $5000 up now turns over about one-half of its *total* income to federal, state, and local tax collectors. Before the war, this group gave the tax collectors one-third of its collective income.

In sharp contrast, the group of people with incomes under $5000 pays the tax collectors 20% of its income for direct and hidden (mostly hidden) taxes—against 18% before the war. This lower-bracket group needs immediate tax relief but I believe most sincerely that persons earning less than $5,000 have a very vital reason for also supporting tax relief in the much more heavily hit upper brackets.

As you get ahead, you expect your taxes to go up. Taxes should be levied, in principle, according to ability to pay. But today tax rates rise so sharply that they virtually destroy all incentives to get ahead, to save, and to invest in new and untried enterprises that open up new jobs. *The progressive tax idea now carried to punitive extremes has become a destructive tax revolution.*

Today the U.S., envied by all the world for the wealth it has won under capitalistic incentives, has cut its incentives below those offered by that state whose police methods strike terror into the hearts of all workers.

Soviet Russia rewards successful managers, writers, and scientists better relatively than we do under our present tax system.

A revolution that sweeps away incentives will quickly sweep away our free enterprise economy. The only substitute ever found for free incentives is the whip-and-lash compulsion of the police state. And no police state has ever been able to match the production of a free people with a free economy that gives adequate rewards to individual producers.

3. The tax revolution hits squarely the average American's chances of keeping a job and of getting ahead.

If you make less than $5000 a year you may well ask why you should worry about a tax revolution that seems directed at the comparatively small group, about 10% of American families, who make $5000 a year or more.

The answer, it seems to me, is that "risk capital," the money that makes new jobs when invested in growing companies or in new businesses, must come largely from the people making more than $5000 a year. The others usually cannot afford to take any risks with their savings.

It was the savings of this 10% group that made possible the huge growth in American industry and American jobs and our progress in raising American living standards in the years before 1930.

Now the government is taking so much from the 10% group in taxes that they cannot afford to risk any savings they manage to accumulate. Most of their savings now go to insurance companies and savings banks which are barred by law from making risky investments or investments even in seasoned common stocks.

The flow of risk-capital from this 10% group can only be renewed by reducing their taxes. The result will benefit everyone over the difficult years to come by providing more and steadier employment for all.

The cost of the presently proposed reduction, *less than 1% of the national income,* can well come out of current revenue surplus. It will be repaid many-fold by the new enterprises it will stimulate.

4. Jobs will be lost if risk-capital does not increase.

Unless the flow of risk-capital into business *can be doubled* and *trebled* in the next few years, business investment in job-making new plants and equipment will drop sharply. The McGraw-Hill survey of prospective capital expenditures, reported in the previous editorial in this series, made that quite clear.

When such a drop in business investment has come in the past, it has brought with it a general slump in business – and unemployment.

As we work through the enormous demand for goods of all kinds built up during the war years, and as the war-accumulated savings of businesses and individuals are spent, it will be harder and harder to keep production and employment at today's high levels.

Then—at the very time that we shall need all our drive to maintain prosperity—we shall be hit by the full impact of the tax revolution.

5. Compounding these troubles is a tax system as out-of-date as an oxcart.

Twenty years ago, when taxes took only twelve cents out of the national income dollar, our rattle-trap tax system was little more than a nuisance. Today, when it takes twice as big a bite, its double-taxing of the earnings of investors, its discriminatory excises, and the overlapping of federal, state, and local levies are a fatal handicap. A new system, a fair system, a rewarding system, is a necessity if American initiative and enterprise are to have a fair chance.

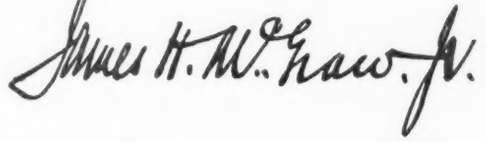
What Congress does now about federal taxes will bear crucially on our ability to sustain prosperity.

By demanding economy in government and by re-designing the tax system to stimulate initiative and risk-taking, Congress can multiply many times our chances of maintaining full employment and of raising living standards.

By allowing people to save more and by renewing the incentive to risk capital in new enterprises, Congress can actually insure a bigger tax return in the years ahead. More business will result – and pay more taxes.

That is the only way that a free people with a free economy can carry the tax load.

That is the best way that our government can improve our chances of keeping our jobs and of getting ahead. I suggest that you discuss these vital matters with your chosen representatives in Congress, in your state government, in your local community.



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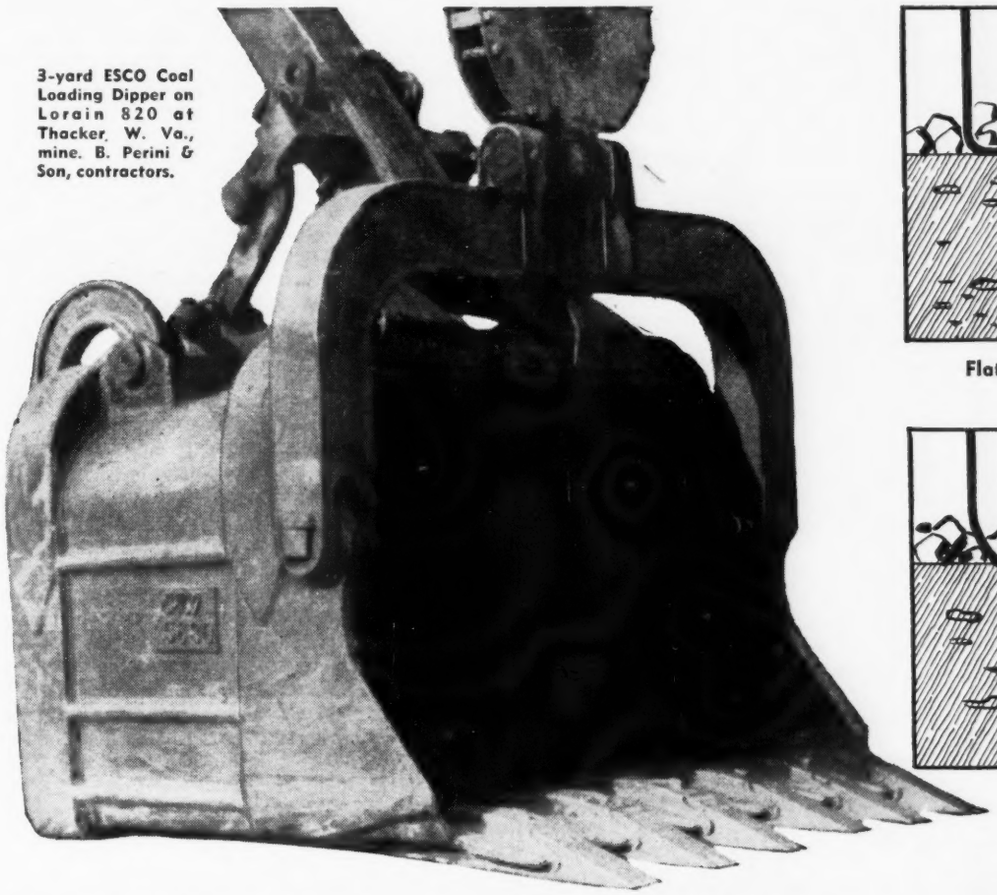
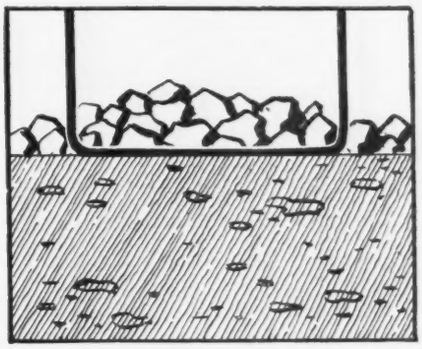
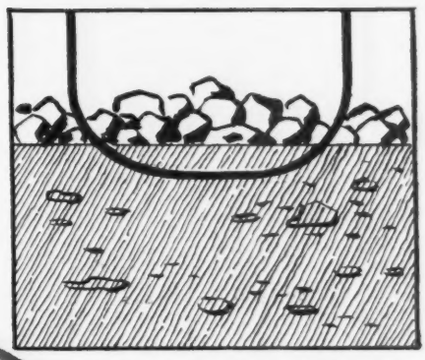


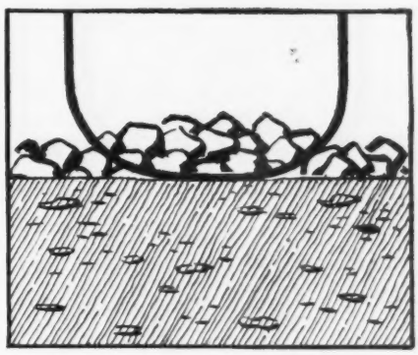
3-yard ESCO Coal Loading Dipper on Lorain 820 at Thacker, W. Va., mine. B. Perini & Son, contractors.



Flat lip of ESCO coal loading dipper takes no dirt, cleans up coal.



Round lip takes dirt—



—or wastes coal.

Proper tools make any job go faster and easier. And to anyone loading coal, proper tools mean *ESCO* coal loading dippers.

Built to *ESCO's* own design, these buckets—

Increase Payloads. Take advantage of light weight of coal. Increase payload 40 to 50% without overloading shovel.

Give Good, Fast Cleanup in Pit. Long, sharp teeth are closer together than on ordinary dippers, have only slight pitch. Flat front gets all the coal with a minimum of dirt.

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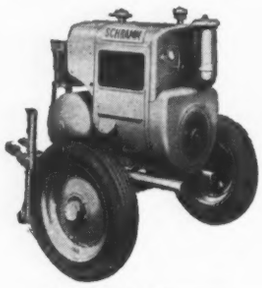
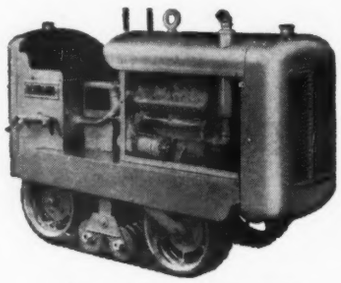
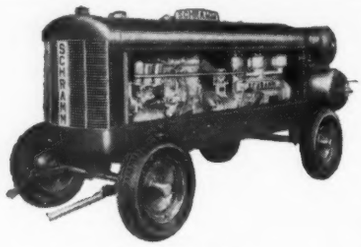


20/35 Model Compressor

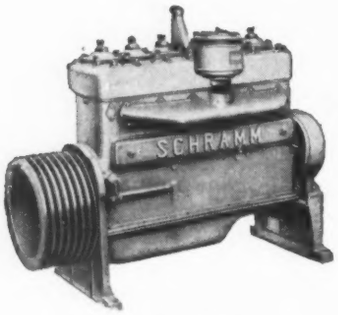


No. 60 Self-Propelled Compressor

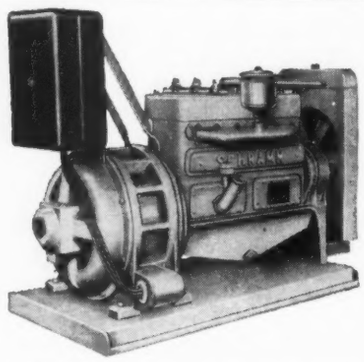
Skidded for Truck Mounting



Diesel Engine Drive



"V" Belt on Flat Pulley Drive



Built-in Motor Drive with Cooling Unit and Starter

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motors, or valves that have lapped surfaces;

4. When starting a rebuilt pump, operate the controller by the off-and-on method until the system fills with oil so as to break in the pump slowly.

5. Pressure should be applied by the on-and-off method after the system is filled, thus permitting the high points to be worn off rather than destroying the hard surface through heating and seizing of the rotating surfaces. Starting a system filled with air at full speed will result in seizing from the lack of cooling oil on the rubbing surfaces.

6. Filters perform the best service when placed on the intake to the pump, but when new and so mounted they should be oversize so that material collected by them will not reduce the area, causing cavitation of the pump. The restricted filter or intake line will cause noise, foaming, and prevent the normal volume from being delivered from the pressure side.

7. A cleanable-type filter is preferred to a screen type as it can be cleaned by the turning of a handle, thus permitting a full cleaning area for the oil and permitting the pump to operate with a minimum vacuum in the intake side.

The trend in new designs of modern machinery is operation by hydraulic control because it is easy to operate and unlimited power can be conveyed to remote places through a flexible hose. An educational program should be inaugurated wherever hydraulic equipment is used or repaired, said Mr. Slomer.

•

Varied Program Planned For Coal Convention

Plans for the 1948 Coal Convention of the American Mining Congress, to be held at Cincinnati, April 26-28, are developing rapidly, Julian D. Conover, Secretary, reported last month, in announcing a preview of the program for the three-day meeting.

The convention's ten sessions will be devoted to coal's economic situation and outlook, coal utilization, strip mining, mine management and safety, personnel problems and training, underground haulage, maintenance, coal preparation, and mechanical mining problems. The program was developed by a national committee of coal operators and equipment manufacturers, under the direction of T. G. Gerow, executive vice president, Truax-Traer Coal Co., Chicago.

According to present plans, the opening address of the meeting will be made by U. S. Bureau of Mines Director James Boyd. At the same session, Dr. John I. Yellott, director of research, Locomotive Development Committee, Baltimore, will discuss the possibilities of increasing coal utilization; and Charles E. Hemminger, senior engineering associate, Standard Oil Development Co., Elizabeth, N. J.,

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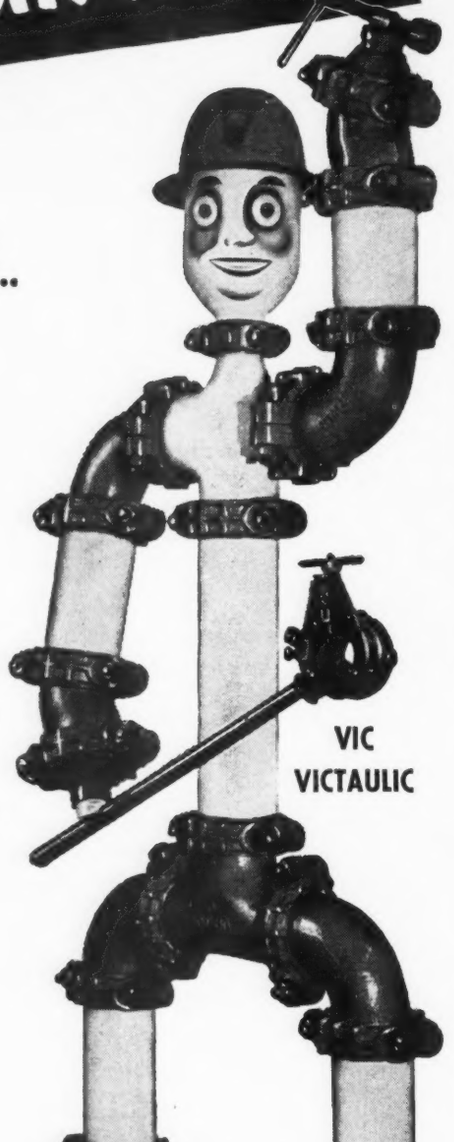

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will describe the obtaining of synthetic oil and gas from coal.

Other sessions on April 26 will be devoted to coal stripping and to underground haulage of coal. R. T. Laing, Mineral Producers Association of Pennsylvania, will speak on Coal Stripping Legislation, and his paper will be followed by a symposium on Stripped Land Reclamation in which the following will participate: J. W. Bristow, secretary-treasurer, Illinois Coal Strippers Association: Larry Cook, executive director, Ohio Reclamation Association; Dr. A. G. Chapman, chief, Central States Forest Experiment Station; Orel E. John, vice president, Reclamation Development Co.; L. E. Sawyer, director, U. S. Forest Service, Terre Haute, Ind.; and T. C. Cheasley, Sinclair Coal Co. Speakers and papers at the haulage session will include: C. W. Thompson, Weirton Coal Co., "Conveyors for Main and Gathering Service"; Joe Bose, superintendent, Templeton Coal Co., "Haulage System for Track-Mounted Equipment"; and W. P. Tams, president, Gulf Smokeless Coal Co., "Combination of Track and Belt Conveyors."

At a special session devoted to management and safety, April 27, K. L. Konnerth, H. C. Frick Coke Co., will describe means for attracting young men to coal mining, and Russell W. Beamer, superintendent of training, Rochester & Pittsburgh Coal Co., will outline methods and practices used in developing supervisory personnel. Safety in coal mining will be discussed by James Hyslop, executive vice pres., Hanna Coal Co.

Other sessions on April 27 will feature the following addresses: "Machine Cutting with Tungsten-Carbide Bits," by H. H. Fletcher, Dickinson Fuel Co.; "Mechanical Kerf Cleaning," by V. D. Hanson, mechanical engineer, Pittsburgh Coal Co.; "Drilling and Blasting with Airdox," by R. L. Adams, general superintendent, Old Ben Coal Corp.; "Timber Setting and Recovery with Machines," by George W. McCaa, general superintendent, Consolidation Coal Co., (W. Va.); "Roof Support with Suspension Rods," by C. C. Conway, Consolidated Coal Co.; "Preventive Maintenance for Face Equipment," by H. C. Bean, superintendent, Walter Bledsoe&Co.; "Belt Care and Maintenance," by J. A. Bottomley, assistant mine superintendent, Sahara Coal Co.; "Power Distribution for Mechanical Mining," by L. D. Siniff, mechanical and electrical engineer, Consolidation Coal Co. (Ky.); "Developments in Hauling Overburden," by Alan E. Coddington, engineer, Carey, Baxter & Kennedy, Inc.; "Progress in Coal Haulage," by Lester E. Briscoe, electrical engineer, Ayrshire Collieries Corp.; and "Vibrations in Surface From Heavy Blasting," by Jules E. Jenkins, Vibration Measurement Engineers.

The morning session, April 28, will highlight coal preparation. Speakers and their subjects include: "What's

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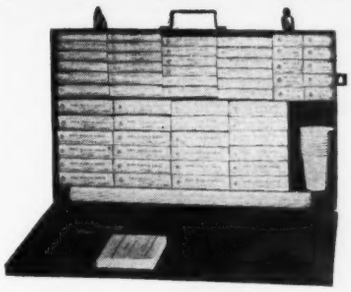
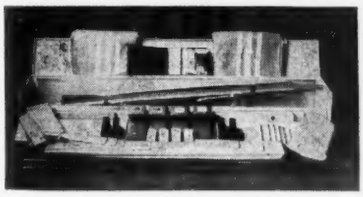
Better First Aid MSA

in and around the mine



M·S·A MINERS FIRST AID CABINET

This large and completely equipped cabinet contains a complete assortment of first aid materials and supplies suited to the requirements of the mine hospital or dressing station. The cabinet conforms in its contents to materials recommended by the United States Bureau of Mines for first aid treatment, and provides these in ample quantities. Designed for wall mounting, or transportation when required, the M.S.A. Miners First Aid Cabinet is an essential item of mine-safety equipment.



M·S·A CONTEST OUTFIT

for First Aid Training and Contests

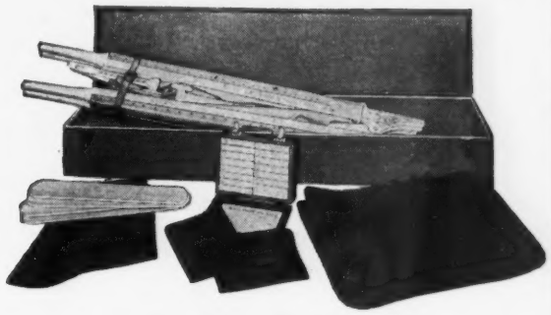
This outfit contains in a strong steel box the complete U.S. Bureau of Mines-recommended list of materials for first aid practice and contest work. The outfit simplifies transportation, aids in preventing loss or misuse of materials and aids the efficiency and appearance of the group. The Contest Outfit Box is of white-finished 24 gauge steel, with strong handles on either end. Further details on request.

M·S·A *All-Weather* FIRST AID KITS

Sturdy steel cases and complete assortments of unit-packaged first aid materials combine to make these portable kits ideal for exacting mining use. Each unit package contains one or more complete treatments for injuries, without waste. All liquids are hermetically sealed—all dressings are sterilized—the unit packages fit like blocks in the cases. The heavy-gauge steel case itself is dustproof and moistureproof, with a special replaceable rubber gasket sealing the edges when closed. Write for Bulletin FA-93.

M·S·A REDI-HEAT BLOCK

A unique, self-contained, safe emergency heat source for first aid applications—always ready for immediate use; produces top heat in 60 seconds—employs no liquids. The replaceable Redi-Heat Charge cylinder is unaffected by heat, moisture, weather or temperature and has unlimited storage life. Wrapped in cloth, block provides heat for approximately one hour per charge. Bulletin FA-92.



M·S·A FOLDING STRETCHER OUTFIT

A complete stretcher outfit contained in a durable steel case—suitable for easy transportation underground. The folding stretcher opens quickly to full-size army type, and has a selected dried ash frame, with all metal parts of malleable iron and cover of 12 oz. duck. Also included are a wool and a rubber blanket, four wood splints, two Redi-Heat Blocks, and a 16-unit M.S.A. All-Weather First Aid Kit. The Folding Stretcher Outfit case is finished in red crackle enamel with white lettering. Dimensions are 53" x 11⅝" x 8". Carrying handles at ends and brackets for mounting are standard. Bulletin FA-77.

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New in Coal Preparation," by Henry O. Erb, coal preparation consultant, Terre Haute, Ind.; "Cleaning Fine Coal Sizes," by J. W. Woomer, mining engineer, Wheeling, W. Va.; and "Refuse Disposal from Cleaning Plant"—(a) Anthracite Methods by Frank Meyers, division engineer, Philadelphia & Reading Coal & Iron Co.; (b) Appalachian Methods by Stephen Krickovic, chief engineer, Eastern Gas & Fuel Associates; (c) Mid-West Methods by John R. Wilson, preparation manager, Union Collieries Co.

In the afternoon of the final day, the mechanical-mining session will consist of the following papers: "Thin-Seam Mining with Self-loading Conveyors," by P. R. Paulick, consulting engineer, Library, Pa.; "Thin-Seam Mining with Conveyor Loader," by Stanlee Hampton, president, Tennessee Consolidated Coal Co.; and "Continuous Mining by Combination Cutting and Loading Machine," by Stanley Blose, president, Consolidated Coal & Coke Co.

The final strip-mining session will feature: "Draglines VS. Shovels in Deep Overburden," by O. E. May, superintendent, Northern Illinois Coal Corp.; and "Large-Scale Side-Hill Stripping," by Harold L. Bailey, Bailey Construction Co.

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Program Announced for Anthracite Conference

Papers by both educators and industrial engineers will be included on the program for the Sixth Annual Anthracite Conference to be held May 6-7 at Lehigh University, Bethlehem, Pa., according to the program announced last month by A. C. Callen, chairman of the conference and head of Lehigh's Department of Mining Engineering.

At Session No. 1 on "Mining and Preparation," Dr. R. T. Gallagher, associate professor of mining engineering at Lehigh, will present a paper "The Dewatering of Fine Size Anthracite Coal"; and C. H. Matthews, electrical and mechanical engineer, and D. W. Jones, mechanical engineer, Susquehanna Collieries Division, M. A. Hanna Co., Nanticoke, will discuss "Breaker Waste Reclamation by Froth Flotation."

Papers at Session No. 2 will include "Anthracite's Part in Smoke Abatement," by J. F. Barkley, chief, Fuels Utilization Branch, U. S. Bureau of Mines; Future Supplies of Principal Fuels in Competition with Anthracite," by J. A. Corgan, chief, Anthracite and Coke Section, U. S. Bureau of Mines; "Factors Affecting Anthracite Markets," J. D. Jillson, secretary, Anthracite Institute; "Anthracite—One of the Outstanding Promotional Programs of 1948," by William McKeehan, vice president, J. Walter Thompson Co.

At 8 p.m. Thursday night, a symposium on the utilization of anthracite

the P&H's are Teaming Up!

P&H Model 1400 (4 cu. yds.) owned by the Shen-Penn Production Company at Shenandoah, Pa.

A new P&H 1600 (6 cu. yds.) teams up at Shen-Penn in the strip mining of anthracite coal.

In one location after another owners are reordering P&H Electric Shovels to gain important new operating advantages... For example: P&H's independent propel drive. Change from dig to propel is made instantly by merely flicking the master propel switch . . . there are no mechanical complications of transferring of power from one shovel function to another . . . no sliding gears or mechanical clutches . . . no gear shifting. Faster, easier move-ups with P&H's independent propel machinery mean less trouble, less time wasted. The machine keeps in more efficient digging position . . . cuts tonnage costs. Along with Magnetorque drive, it's another important P&H *added value.*

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by power plants will include "The Burning of Anthracite in Power Plants," by R. L. Hallman, plant betterment engineer, Pennsylvania Power & Light Co.; "The Pulverized Anthracite Installation at the Suburban Plant of the Scranton Electric Co.," by D. D. Schulz, results engineer, Scranton Electric Co.

The Friday morning's session on the "Uses of Anthracite" will include: "Cupola Operations Using Anthracite," by Dr. C. C. Wright, chief, division of fuel technology, Pennsylvania State College; "The Use of Anthracite for Sintering," by A. R. Walter, assistant superintendent of the concentrator and sintering plant, Bethlehem Steel Co., Lebanon; "Upgrading Fine Sizes of Anthracite by Extrusion —Part II," by Paul A. Mulcey, director, and James W. Eckerd, senior engineer, Anthracite Institute laboratory; "Present and Future Anthracite Burning Equipment," by Dr. R. C. Johnson, vice president, research, Anthracite Institute; "The Blending of Anthrafines in Coke Production," by J. D. Clendenin, assistant professor, division of fuel technology, Pennsylvania State College, and Joseph Kohlberg, chief chemist, Laclede Gas Light Co.; and "General Summary of Conference Papers," by A. C. Callen, head of the department of mining engineering, Lehigh University.

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New Developments

• Pocahontas Fuel Co. is planning to reopen its Itmann mine, at Itmann, Wyoming County, W. Va., closed for the last 20 years, according to O. L. Alexander, New York, president of the company. The mine, which will be drift operation with a capacity of 1,500,000 tons annually, will be completely equipped with mining machinery, new buildings, tipple and cleaning plant, at an estimated cost of $8,000,000. The property is estimated to contain about 32,000,000 tons of Pocahontas No. 3 coal available for development.

Work on machine shops and other surface buildings is expected to begin immediately, with underground development to start in eight to ten months. Completion of the cleaning plant is not expected for 32 months, the company said.

• The Hart-Ross Coal Co., Mortons Gap, Ky., coal producer in western Kentucky for the last 27 years, has been acquired by the Zeigler Coal & Coke Co., Chicago. The sale involved both the company's Moss Hill mine at Mortons Gap and its Cardinal Coal Co., which is developing a new mine west of Madisonville. The Moss Hill mine will be leased and operated by the Bell & Zoller Coal & Mining Co., Chicago. The Cardinal mine will continue to be operated by the Cardinal Coal Co. and will be developed to a daily capacity of 8,000 tons on two

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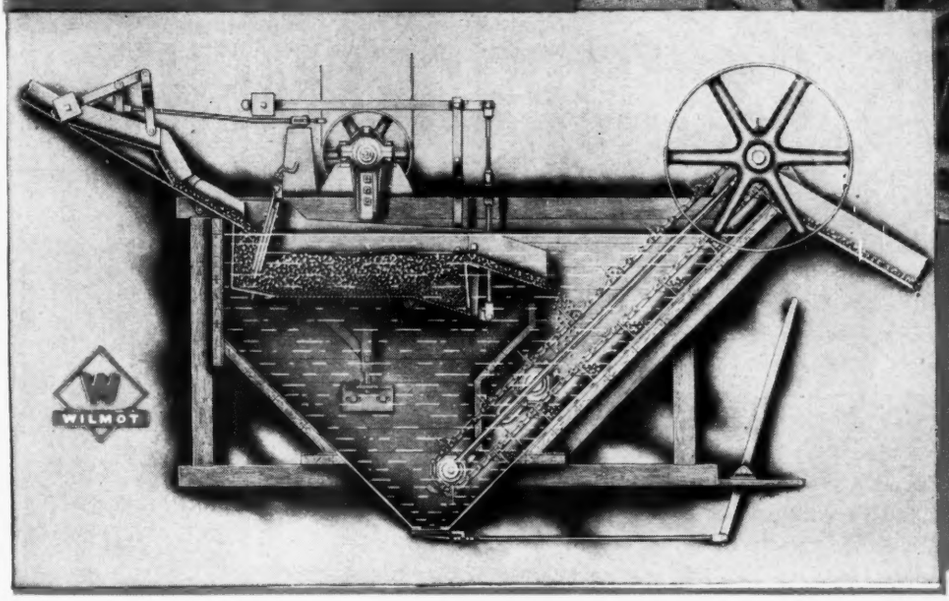
WILMOT 'SIMPLEX' JIGS RAISE CAPACITY 25%



Get Your Copy of NEW 120-PAGE BOOK ON COAL CLEANING

REQUIRE *Less* SPACE, WATER AND ADJUSTMENT. THOUSANDS INSTALLED

The product of almost 40 years of manufacturing experience, Wilmot jigging washers incorporate engineering features which today distinguish them as the simplest, most compact, and lowest in operating and maintenance cost.

Outstanding among the features is the Wagner pan movement. Repeated tests of installations show tonnage increases of 25% to 30%. Greater capacity is achieved by the combination of vertical and horizontal pan movements, which speed discharge.

The advanced engineering of Wilmot jigs is evidenced in their smaller requirements of floor space, head room, and water. No continual supply of water is required, and only a minimum number of slushings. Simplicity of design also saves horsepower and weight without loss of ruggedness.

Wilmot 'Simplex' jigs are made in 4 sizes with capacities from 12 to 75 tons per hour. Utmost flexibility of power application. Jig bottoms are of sheet steel or brass, cast iron or cast bronze. Send for our new catalog. Our engineering service, based on installing thousands of jigs, is promptly available.

KEYSTONE RIVETLESS CHAIN, originated by Wilmot, is used in many types of conveyors and elevators. Prompt shipment of spare parts from our complete stock.

WILMOT ENGINEERING CO.

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Plant:
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Wilmot Coal Preparation Equipment: Hydrotators • Hydrotator-Classifiers • Hydro-Separators • Simplex Jigs Crushing Rolls • Sizing Shakers • Bucket Elevators • Conveyors • Car Hauls • Keystone Rivetless Chain, etc.

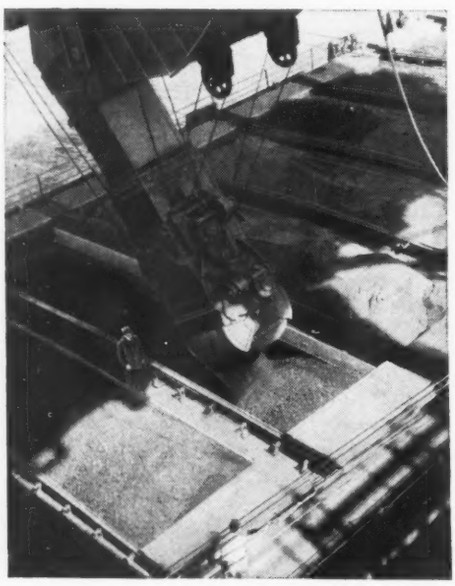
WILMOT BUILDS BETTER BREAKERS

CHESAPEAKE & OHIO IS SPENDING $3,500,000 ON IMPROVEMENTS

...at its Toledo Docks!

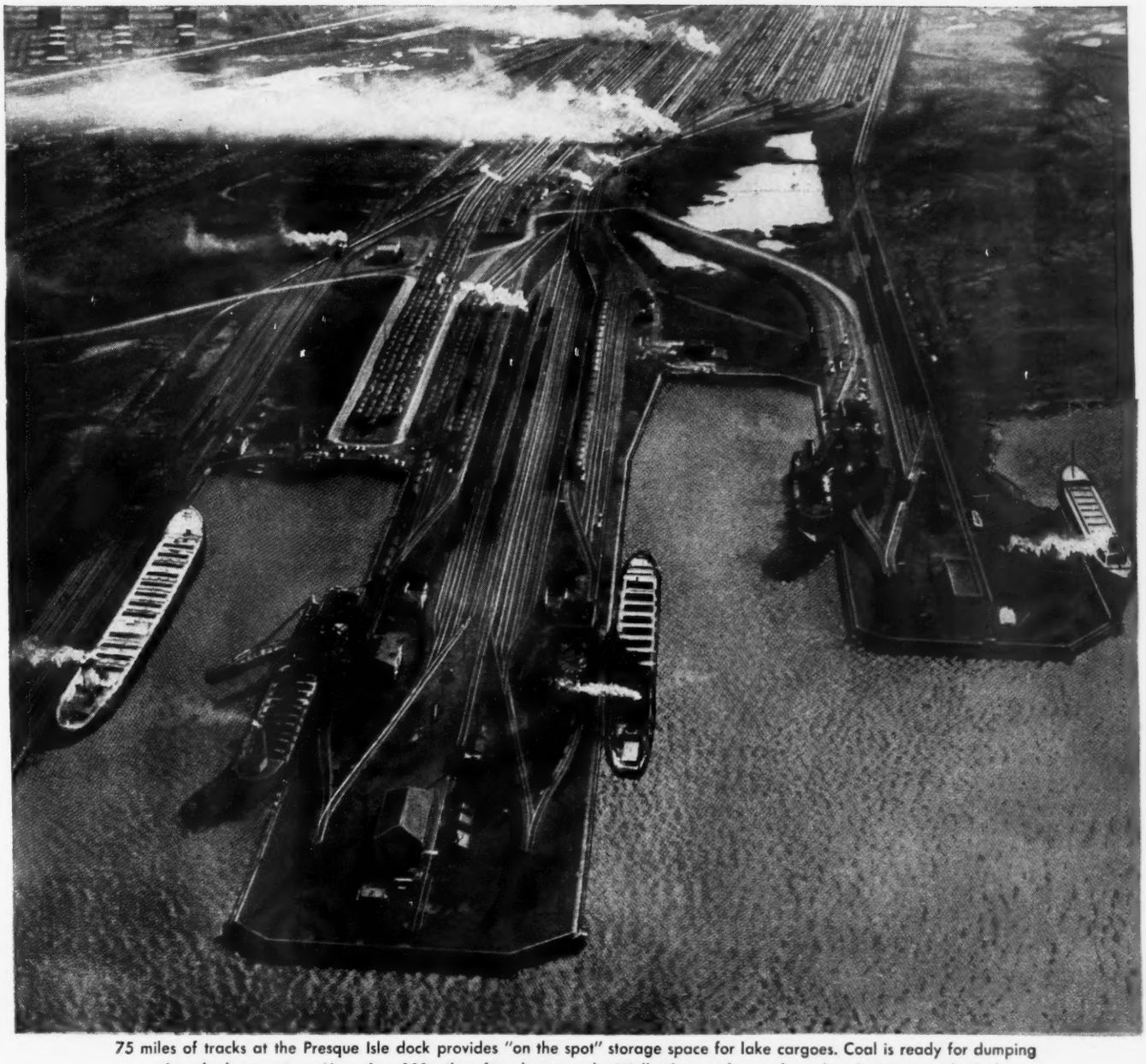
The Entire Coal Industry Will Reap the Benefits

Here are the facts! In 1947, Chesapeake and Ohio's Presque Isle docks established the all-time record for any port on the Great Lakes. These docks dumped seventeen million tons of coal during this period. • Now, to insure still greater efficiency for 1948 and the future, Chesapeake and Ohio is spending $3,500,000 to further improve its coal handling facilities. • This program includes the Presque Isle Docks and assembly yard, and extends to C & O's Walbridge yard which serves the dock facilities. • Other improvements have been made at Columbus, Ohio, and Russell, Kentucky. • The results of these improvements will be reflected in better service . . . all the way from the mine to the consumer.



The combined capacity of Presque Isle and Walbridge yards is over 15,000 cars. Almost 200 miles of track handle record volume of Lake Coal.

In addition to three low-levels piers, with handling capacity of 8,000 tons of coal per hour, Presque Isle provides three 17-ton Hulett ore unloaders.



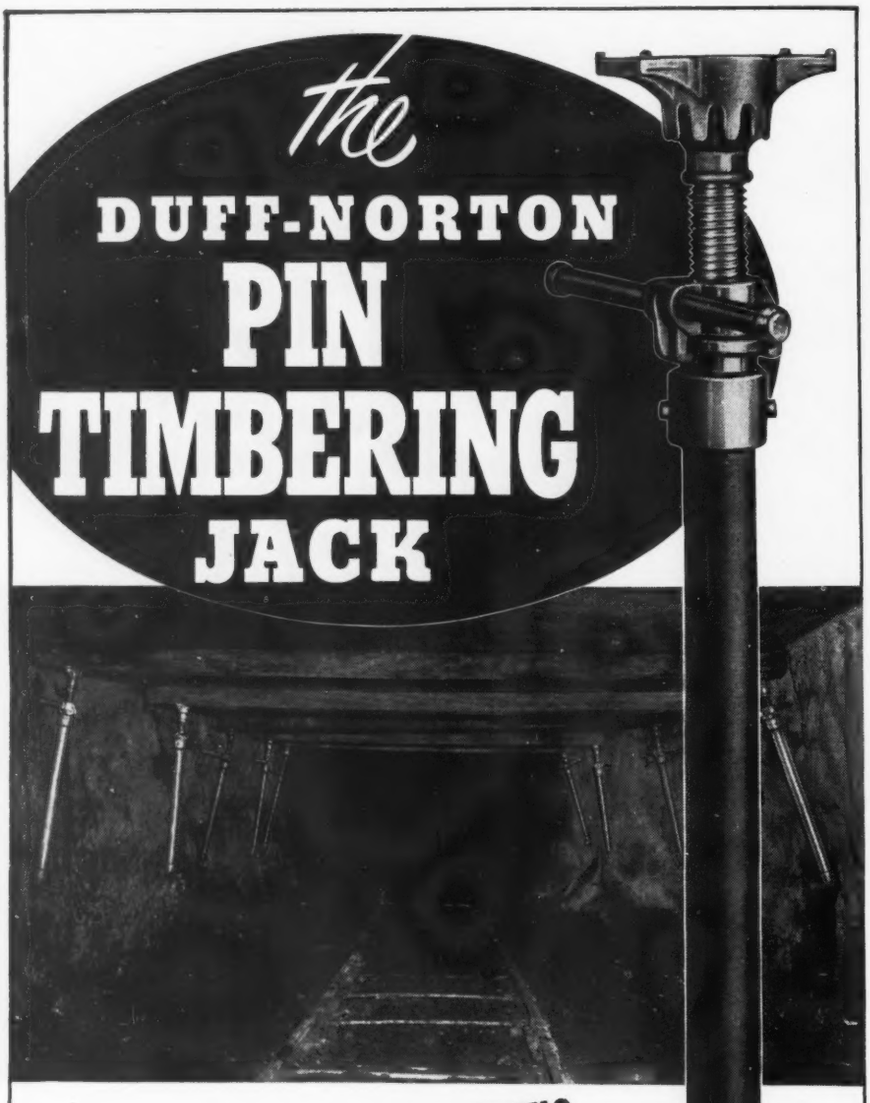
75 miles of tracks at the Presque Isle dock provides "on the spot" storage space for lake cargoes. Coal is ready for dumping when the boat arrives. More than 100 miles of tracks at nearby Walbridge yards speeds coal to the Presque Isle docks.

Important Items on the C&O Improvement Program:

- A NEW "HUMP"
- INSTALLATION OF MECHANICAL CAR RETARDERS
- NEW BUILDINGS
- A PNEUMATIC TUBE SYSTEM
- ADDITIONAL TRACKS
- ENGINE HOUSE IMPROVEMENTS

CHESAPEAKE AND OHIO

Largest Originating Carrier of Bituminous Coal in the World



★ FACILITATES FACE TIMBERING
★ CUTS TIMBER COSTS—SAVES TIME
★ GIVES INCREASED SAFETY

Pin timbering—new and efficient method of face timbering—utilizes Duff-Norton Pin Timbering Jacks for supporting cross-bars in working places, as illustrated above. Jacks are set on pins 1½" in diameter and 18" long, which are placed in rib holes 2 feet from the bottom so that 3" or 4" protrude. Pins serve as rests for the jacks and transfer the load to the rib. Write for descriptive literature which gives complete data on Pin Timbering, and jacks required for installing this face timbering method in your mine.

See Your Local Industrial Distributor

Write for Literature

THE DUFF-NORTON MANUFACTURING CO.
"The House that Jacks Built" • PITTSBURGH 30, PA.
THE WORLD'S OLDEST AND LARGEST MANUFACTURER OF LIFTING JACKS

shifts. It is expected to be the largest underground property in western Kentucky. Brent Hart, president and general manager of the companies, will be associated with the Zeigler company and will continue to be directly connected with the development of the Cardinal mine. Employees of the company will be absorbed into the Zeigler organization or those of the lessees. The company is understood to be planning construction of new tipple and cleaning facilities, at an estimated cost of $1,000,000. The washing plant is planned for a capacity of 500 t.p.h. Coal from both mines will be sold by Bell & Zoller.

• Plans for the opening of five new deep mines with a total capacity of 55,000 tons daily by the H. C. Frick Coke Co. and the United States Coal & Coke Co. are reportedly under way. One operation is expected to open in 1948, the other four sometime in 1950.

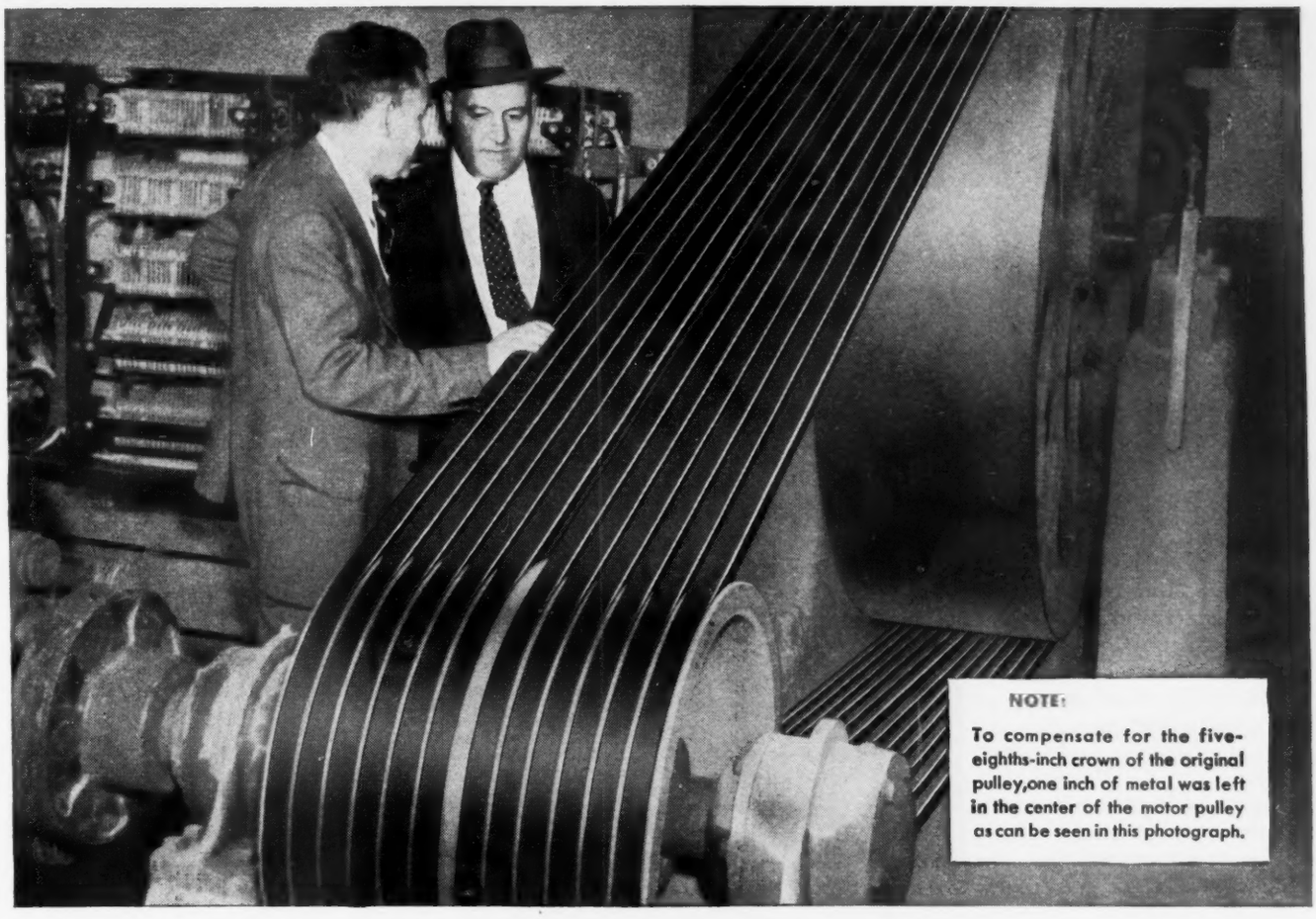
Two of the new mines, both to open in 1950, will be Frick operations. One, with a capacity of 15,000 tons daily, will be located in the Mingo field of Pennsylvania, with a life expectancy of 30 years. The other will be located in the Brown's Fifth Pool area of Pennsylvania, on the Pennsylvania R. R., with a capacity of 5,000 tons daily and a life expectancy of 15 years.

The U. S. Coal & Coke will open Gary No. 14 in West Virginia during 1948. It will be located on the N. & W., with a life expectancy of 25 years and daily capacity of 10,000 tons. Gary No. 20, to be opened in West Virginia in 1950, is being planned to produce 20,000 tons daily, with a life of 35 years. The High Splint mine will be opened in Kentucky, on the L. & N. Ry., with a life expectancy of 35 years and daily production of 5,000 tons.

It is understood that these mines are being planned to replace operations now being worked out and that no appreciable increase in the companies' over-all capacity is expected as a result.

• Purchase of the Darr Smokeless Coal Co., Asco, W. Va., operating a mine at Twin Branch, W. Va., was announced by the Jones & Laughlin Steel Corp. last month. The mine has been producing 700 to 800 tons daily and J. & L. is expected to increase output to 1,700 when mechanization is fully completed. Coal reserves, located in Wyoming and McDowell Counties, are estimated to total 10,000,000 tons.

Acquisition of this low-volatile coal in the Davy-Sewell seam, added to that produced at its mine at Mullens, W. Va., is expected to provide J. & L. with all the low-volatile coal needed to produce high quality coke, with increased blast-furnace iron production and enlarged steel capacity resulting. Lo-


NOTE:
To compensate for the five-eighths-inch crown of the original pulley, one inch of metal was left in the center of the motor pulley as can be seen in this photograph.

POWER PLANT EXPENSE REDUCED OVER $3,000 ANNUALLY

Boilers and machinery in the power plant of a large Central Ohio clay products manufacturer were badly in need of repairs. To replace worn-out equipment called for large capital expenditures and even with new equipment, estimated operating expenses loomed large. The manufacturer turned to his local Dayton V-Belt Distributor for suggestions. He recommended replacing the original prime mover with a 250-HP electric motor. This eliminated the necessity of replacing and operating the worn-out boilers. Further, though only 13 feet of floor space were available, the Distributor worked out a Dayton V-Belt short-center drive that made use of the original, flat, 8-foot-diameter pulley without removing the 5/8-inch crown.

In the first year of operation, the new motor and drive reduced power plant operating costs over $3,000!

Your own local Dayton V-Belt Distributor can give you similar help with your power transmission problems. With his specialized knowledge he can eliminate nearly 95 per cent of all power drive troubles using standard Dayton V-Belts and the power drive accessory equipment he stocks. If necessary, he can quickly secure the aid of a Dayton power transmission specialist. So, for prompt, profitable solutions to your drive problems call your local Dayton V-Belt Distributor.

THE DAYTON RUBBER COMPANY
Main Office and Factory: Dayton 1, Ohio
Branch Offices: Atlanta, Boston, Chicago, Cleveland, Dallas, Detroit, Los Angeles, Minneapolis, New York, Philadelphia, St. Louis

V-Belt Buyers! A leading mill supply house near you offers specialized Dayton V-Belt service. Look for the name under the trade name heading "Dayton V-Belts" in the yellow pages of your telephone directory.

Dayton Rubber

THE MARK OF TECHNICAL EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

When You're on the Track of GREATER SAVINGS

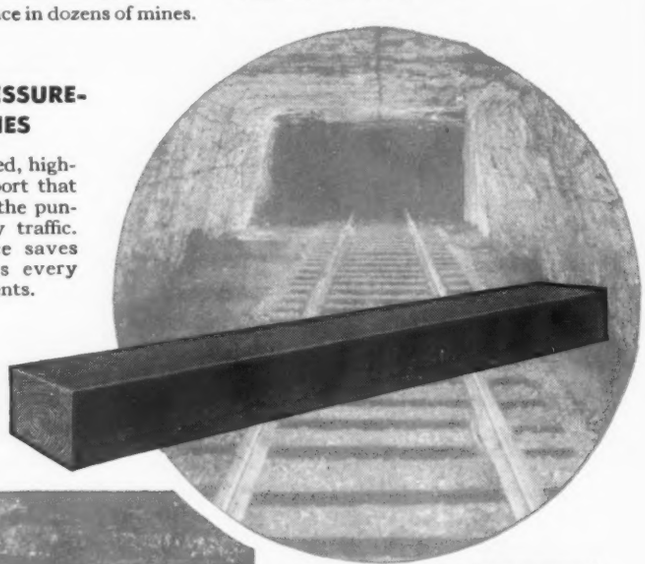
Labor costs have mounted so rapidly that even mines with timber on the property find frequent replacements a serious drain on profits. Any means of extending the life of wood opens a real opportunity for substantial savings . . . and Koppers pressure-treatment provides it.

The longer useful service of Koppers Pressure-Treated ties has been confirmed by experience in dozens of mines. In one typical instance, in a mine where the average life of untreated ties was four years, pressure-creosoted ties were installed. After 21 years, over 97% of these ties were still in service . . . and still serviceable. The dollar saving represented by the elimination of five replacements is obvious.

Koppers Mine ties are available for every need in every mine.

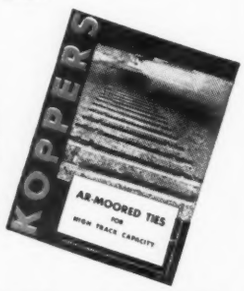
KOPPERS PRESSURE-TREATED TIES

. . . give high-speed, high-safety track support that stands up under the punishment of heavy traffic. Decay resistance saves substantial sums every year in replacements.



KOPPERS AR-MOORED* SWITCH AND CROSS TIES

. . . consist of factory assembled Koppers *Pressure-Creosoted* wood bases topped with Bethlehem Steel Mine Ties. These ties combine the advantages of both types of ties . . . eliminate the use of spikes . . . tampable . . . armored against damage by caterpillar tracks . . . quickly moved to new locations . . . can be reused again and again . . . establish and maintain correct gage.



For full information send for Koppers Ar-moored Ties (Bulletin G-25)

*Trade Mark

K KOPPERS

PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.

PITTSBURGH 19, PA.

cation of the mine makes it possible to haul the coal part way by river, thus reducing transportation costs.

•The Westmoreland Coal Co., Irwin, Pa., is reportedly planning a new 5,000-ton-per-day operation, to be opened late in 1949, in Boone County, West Virginia. The Upper and Lower Stockton seams will be mined and coal is understood to be available for 100 years' operation. The mine will be known as the Hampton mine and will be located on a branch of the C. & O. A new tipple and washing plant to handle at least 2,500 tons per shift will be built and two-shift operation is planned.

• Purchase of Federal No. 3 mine, Eastern Gas & Fuel Associates, Everettville, W. Va., by Pittsburgh Consolidation Coal Co. was announced early last month. The operation, located midway between Fairmont and Morgantown, on the Monongahela Ry., is to be operated by Consolidation Coal Co. (W. Va.). Federal No. 1 mine is not involved in the sale and will continue under present E.G.&F. management. Consol has extensive mining operations on three sides of the territory purchased and it is understood that the newly acquired property will provide additional reserves for present mines that are being worked out.

• Plans for a new slope opening to replace the present Black Eagle No. 2 shaft, near Bellville, Ill., have been announced by W. F. Davis, president and general manager, St. Louis & O'Fallon Coal Co., St. Louis, Mo. Construction of the new facilities, which is expected to cost $400,000, is scheduled to begin this summer. The company is understood to have coal reserves totalling 10,000,000 tons north of its present operations and is acquiring another 10,000,000 tons from the old Gunlach mine.

•Semet-Solvay Division, Allied Chemical & Dye Corp., Bluefield, W. Va., reportedly is planning to begin development in the fall of 1948 of a new mine at Tralee, W. Va., in the Winding Gulf field.

• What is believed to be the largest single order ever placed at one time has been reported in the purchase of 22,400 cast-steel mine-car wheels by Jones & Laughlin Steel Corp. for use on 2,800 new-design mine cars to be installed at its consolidated operation underway at Vestaburg, Pa. The order, placed with The West Steel Casting Co., Cleveland, is expected to be completed within a year.

• Awarding of contracts for the construction of 5.93-mile extension of the C. & O. Ry. from Holden, W. Va., into Mingo County to serve a new mine of the Island Creek Coal Co. (*Coal Age*, February, p. 140), was announced early last month, following authorization by the ICC March 1. In issuing this authorization, the ICC dismissed a petition by the Norfolk & Western that it reconsider its earlier authorization to the C. & O.

You'll get more coal with RED CROWN

No other manufacturer can make Red Crown—the patented Class A Permissible with even *distribution of power!*

Red Crown is surface-sensitized. Its *slow,* heaving action has remarkable spread. It shears the ribs clean, and does not severely shatter the coal in the vicinity of the hole. Red Crown produces excellent results in both friable and firm coal.

With less smoke and obnoxious fumes, Red Crown minimizes lost time after shooting.

HERE'S HOW YOU CAN TRY RED CROWN IN YOUR MINE:
More and more mines are finding that Red Crown results in a greater tonnage of coal per pound of explosive used. A test under your own operating conditions will convince you that Red Crown gives better preparation and performance. Arrange for a demonstration today. All you need do is write or phone us—we'll do the rest. There is no obligation, of course.

THE KING POWDER COMPANY, INC., CINCINNATI 1, OHIO
Incorporated 1878

6 IMPORTANT ADVANTAGES

1. Red Crown is easy on the roof.
2. Slow heaving and spreading action with results similar to those obtained with the use of black powder.
3. Power distributed evenly throughout the face of the cut.
4. Coal displaced in firm, hard lumps means less degradation.
5. Red Crown, containing no nitroglycerine, is the non-headache permissible.
6. Less smoke and fumes means less down-time for expensive equipment.

RED KING EXPLOSIVES CROWN

THE PATENTED, SURFACE-SENSITIZED PERMISSIBLE

UP GOES MOTOR PERFORM-ANCE

DOWN COMES MAINTE-NANCE COSTS

with

OHIO MOTOR BRUSHES

As a basic manufacturer for the past 30 years our organization has been dedicated to the task of designing and manufacturing reliable quality generator and motor brushes. Throughout all industry Ohio Carbon brushes have set a standard for dependability. Keep a stock of them on hand and *you will have efficient motor performance at your fingertips!*

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Community Honors Lehigh Navigation Head

MORE THAN 500 neighbors, friends and associates in the Panther Valley gathered at Coaldale, Pa., Feb. 2, to honor Evan Evans, newly elected president of the Lehigh Navigation Coal Co., Inc., at a testimonial sponsored by the Coaldale Lions Club. Mr. Evans was presented with a set of pipes during the evening. At the speakers' table are, left to right: Thomas Kennedy, international vice president, U.M.W.A.; Mr. Evans; Randolph B. Harvey, Coaldale schools superintendent, toastmaster; ex-Congressman James H. "Casey" Gildea, editor, Coaldale Observer.

Personal Notes

Republic Steel Corp. has announced several changes in personnel for its Northern coal mines district, Uniontown, Pa.; *M. O. Evans*, formerly assistant district manager, has been promoted to chief engineer for the company, with offices in Cleveland, Ohio. *J. H. Reitz*, superintendent of industrial relations, has been named to succeed Mr. Evans. *C. C. Virgin* succeeds Mr. Reitz as superintendent of industrial relations. *C. E. Willsee* has been appointed superintendent of the recently acquired Banning mine (*Coal Age*, November, 1947, p. 118). *G. O. Carson* has been made safety supervisor of the Clyde and Crescent No. 2 mines. *Paul Yeloushan Sr.* has been appointed safety supervisor for the Indianola and Russellton mines.

Elmer Christ, formerly division superintendent, Ashland Division, P. & R. C. & I. Co., has been named general manager of the Gilberton Coal Co. and Centralia Mining Co., Gilberton, Pa.

Garfield A. Schnee, formerly division engineer, has been named division superintendent, Ashland Division, Philadelphia & Reading Coal & Iron Co., Ashland, Pa. *John F. McCall*, division engineer of the company's Pottsville, Pa., division, has been appointed division engineer at Ashland, to succeed Mr. Schnee. *William G. Williams*, assistant division engineer at Pottsville becomes division engineer. *William D. Maurer*, formerly in the Pottsville engineering office, has been appointed assistant division engineer of that office. Each of the new appointees have had more than

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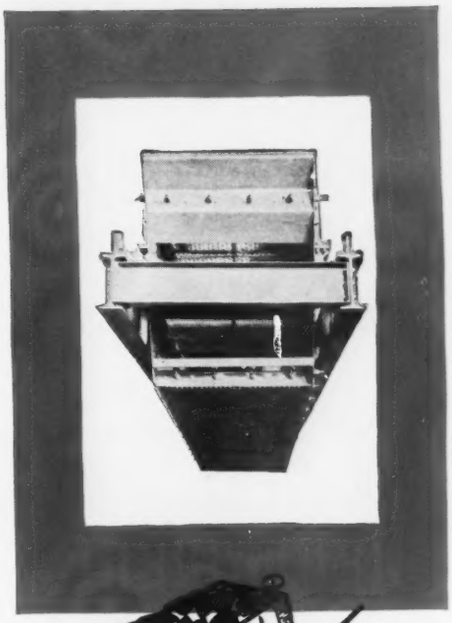
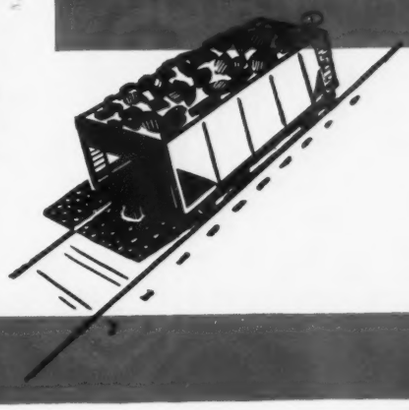
See your Parts Jobber or write direct.
IMMEDIATE SHIPMENT

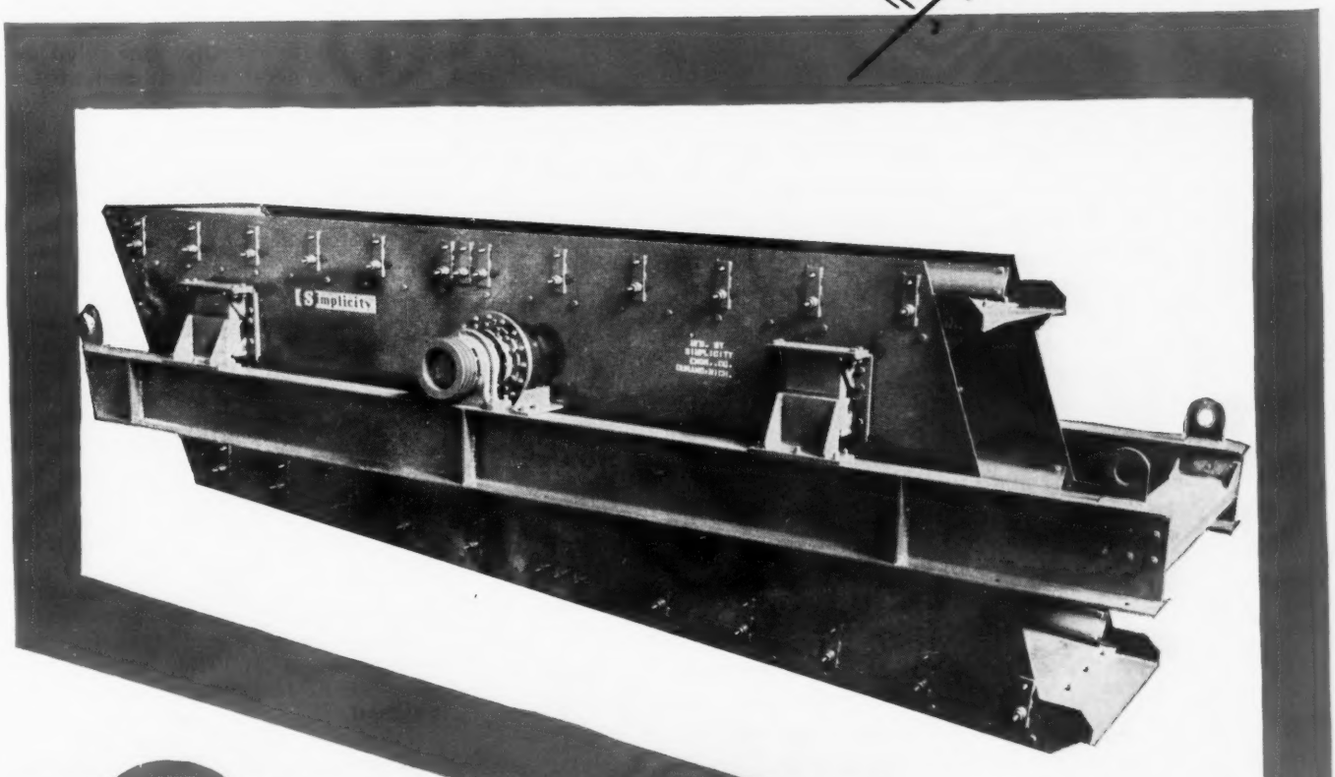
MOTORCRAFT POST OFFICE BOX 470 MUNCIE, INDIANA

SIMPLICITY SOLVES THE DAMP COAL SCREENING PROBLEM . . .



For coal sizing this Simplicity 3' x 12' Model D 3-deck gyrating Screen can't be beat. The special Simplicity Ball-Tray Deck attachment keeps damp-coal moving right along and prevents building up on the wires of the screen cloth thereby eliminating "blinding". Small hard rubber balls in constant movement within the compartments of the Ball-Tray Deck, keep the screen cloth free at all times. Massive Simplicity construction, coupled with advanced Simplicity engineering, assures year-in, year-out dependability with absolute minimum maintenance and repair charges. Your nearby Simplicity representative will be glad to review your sizing and separating problems and recommend specific Simplicity Gyrating Screens that will speed production and profits for you.





Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND, MICHIGAN

• FOR CANADA: CANADIAN BRIDGE ENGINEERING CO., LTD., WALKERVILLE, ONTARIO

On a pound-for-pound basis ARMCO Tunnel Liner Plates are in a class by themselves. They save you money and speed the job on sloped entries or vertical shafts.

These sturdy plates are designed for utmost strength with the least possible weight. One unskilled workman can carry, hold and bolt into place an ARMCO Liner Section. Only a structural wrench is needed. Labor costs are low and the job goes fast. Less bulk also means less excavation, and storage requirements are smaller. With ARMCO Plates you buy no excess metal, and this keeps job costs down.

You'll find ARMCO Liner Plates the simplest, most inexpensive way you ever saw to construct better passageways from ground surface to working levels. They provide worthwhile durability and safety from fire hazards. Use these plates for sloped entries, air shafts, escapeways, substations, overcasts and wherever else you need the protection and other advantages of a steel liner. Write us for prices and complete information on your specific needs. Armco Drainage & Metal Products, Inc., 2205 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION.

ARMCO

ARMCO TUNNEL LINER PLATES

20 years' experience in P. & R.'s engineering corps. Mr. Schnee joined the company in 1921, Mr. McCall in 1927, Mr. Williams in 1924 and Mr. Maurer in 1923.

Hewitt Smith, formerly general superintendent of mines, has been named vice president, Woodward Iron Co., Woodward, Ala.

R. C. Denny has resigned as general manager of operations, West Virginia Coal & Coke Corp., Omar, W. Va., to become general manager of the Black Gold Coal Co., Stone, Ky., operators of the Tierney mine recently purchased from the Tierney Mining Co. by the Portsmouth Steel Co. (*Coal Age*, March, p. 103). Mr. Denny had been associated with West Virginia Coal & Coke for the past six years and for 17 years previously was connected with Consolidation Coal Co. (Ky.).

M. D. Collier, superintendent, Mine No. 15, has been named manager of mines for the West Virginia Coal & Coke Corp., Omar, succeeding R. C. Denny. Mr. Collier joined West Virginia Coal & Coke as superintendent of No. 19 mine in 1942 and had previously been associated with Consolidation Coal Co. (Ky.) for seven years.

John Stephenson, mine foreman, has been appointed superintendent, Warwick mine, Duquesne Light Co., Greensboro, Pa., succeeding J. E. Elkins recently appointed assistant general superintendent for the company.

Consolidation Coal Co. (Ky.), Jenkins, Ky., has announced several changes in supervisory personnel: *Howard L. Riffe* and *T. J. Davis*, for some years repairmen at Mine No. 155, have been made maintenance foreman and assistant maintenance foreman, respectively, at that mine. *Isom Bunch*, timberman, has been appointed section foreman at the Clover Splint mine. *Arlie Webb*, fireboss at Mine No. 207 since his return from military service in 1946, has been made section foreman at the Wright mine. *Charles L. Adams* has been promoted from repairman to assistant maintenance foreman at Mine No. 204.

Harold E. Shomper, Shamokin, Pa., has been appointed Pennsylvania anthracite mine inspector by Gov. James H. Duff, succeeding *Joseph F. Lawrence*, Hazleton, resigned.

James H. Phillips, formerly mine foreman, Castle Gate mine, Utah Fuel Co., has been appointed Utah state mine inspector, succeeding *L. L. Arnett*, resigned.

•

Association Activities

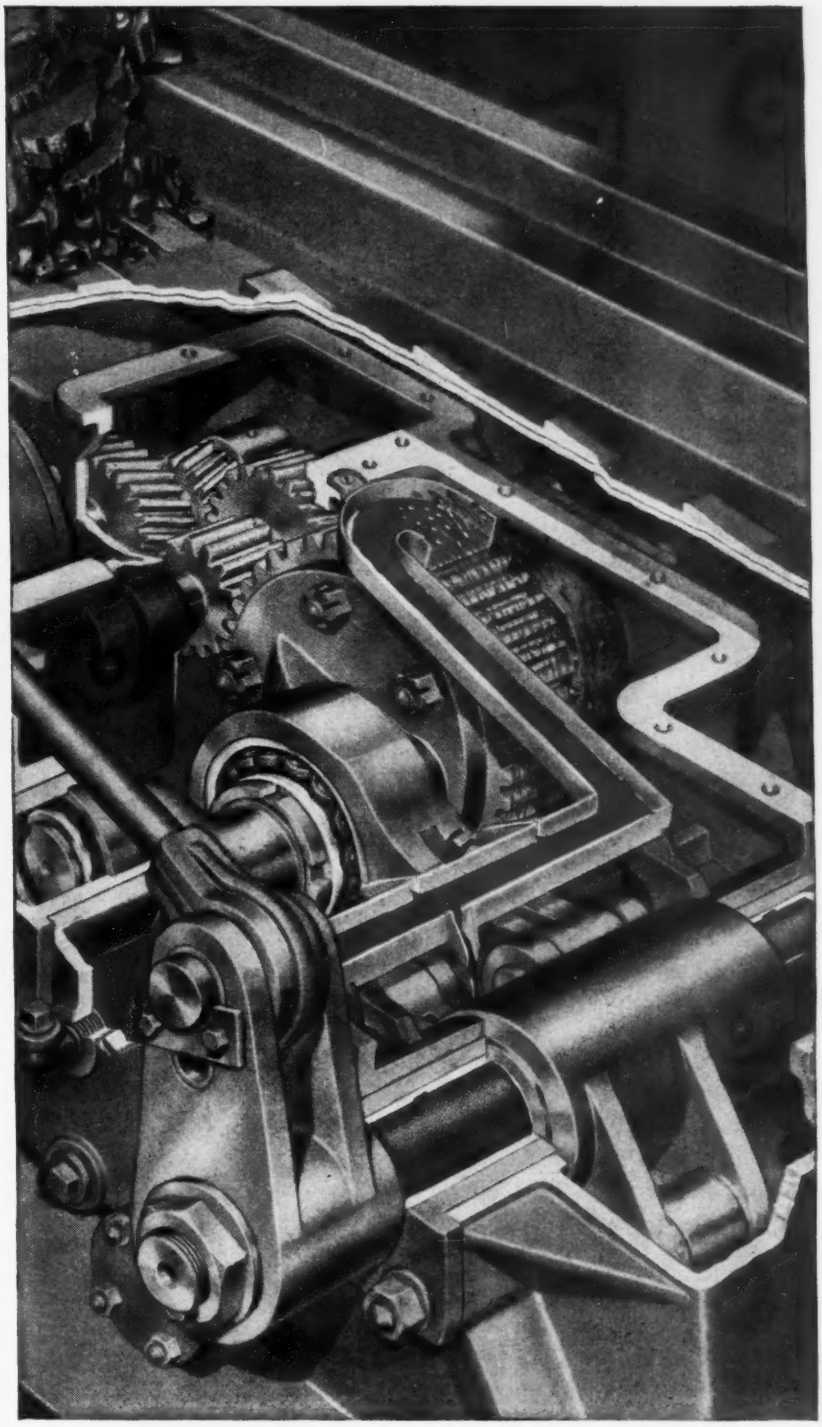
Anthracite Safety Engineers' Association has elected the following officers: president, R. D. Currie; vice president, John D. Cooner;

Inside Knowledge on Lubrication Problems

—SHOCK LOADS—

This is One of a Series of Messages on Lubrication Problems in Your Plant

Oil Gets a Shake-up Here!



As COAL is moved along this shaker conveyor, the drive gears and bearings are subjected to the shocks resulting from the constant shaking, jerking motion.

It takes an oil that will stand up under continuous shock loads to cushion these vital parts against metal-to-metal contact and wear. At the same time, this oil also must flow freely through the troughs and small openings.

Gargoyle Vactra Oil AA distributes completely throughout the entire mechanism and forms strong wear-resisting films on all rubbing surfaces. It's in use in many mines where it has reduced wear to a minimum and brought important savings in time and repair bills.

See your Socony-Vacuum Representative now and get this proved lubricant in your shaker conveyors.

SOCONY-VACUUM OIL CO., INC.
and Affiliates: Magnolia Petroleum Company
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GARGOYLE Lubricants

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FOR EVERY MACHINE . . . EVERY OPERATING CONDITION

Modern machines can go only **part way** in building the **staying** quality for which Goodall belting is famous. What really counts is craftsmanship . . . the **human element,** backed by long experience and pride of accomplishment.

GOODALL "SSS"

The belt made especially for **super-severe service** . . . with every detail of construction designed to assure outstanding strength and efficiency, and long, low cost performance. For run-o'-mine coal, ores, rough slag, crushed limestone up to 8", wet or dry. Specifications details determined by requirements. Can be supplied endless if desired.

BUILDING GOODALL BELTING is a very personal matter with several Goodall men. They've been at it a long time, and their expert craftsmanship and traditional pride are all-important factors in maintaining the high standard of quality by which "SSS" and other Goodall belts are recognized.

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secretary-treasurer, Carl H. Riehl; program committee, Roger J. Howell, George Brecker, Ralph Unger, Stephen J. Nemshick, Arthur Glance and Thomas F. Price. Fifty members attending the meeting heard D. W. W. Policoff speak on industrial accidents.

Western Pennsylvania Coal Operators Association has re-elected Ralph E. Jamison president and has named the following new officers: vice president, J. B. Morrow; executive vice president, Harry A. Sutter; treasurer, M. C. Briggs; and secretary, Earl Glass. Directors elected, including Messrs. Jamison and Morrow, were: C. B. Baton, F. H. Coleman, F. B. Dunbar, H. C. Goodhart, G. H. Love, W. A. McBride, C. C. McGregor, C. W. Pollock, E. A. Siemon, G. C. Trevorrow and F. G. West.

Anthracite Operators Association has elected the following officers: president, R. L. Birtley; vice president, L. J. Pagnotti; treasurer, Bruce Payne; director-at-large, James Pierce; executive secretary, L. F. Weichel. Also, regional directors were elected as follows: Carbondale—B. L. Stone, James Mascelli and Joseph DeAngelis; Wyoming—W. A. Lambert, Peter Minichello, Maj. J. A. Hart, Steve Dubernos, Paul Conlon and John McDade; Hazleton—T. F. Steele, George Chisnell and E. H. Whitney; Southern—B. H. Hay, E. J. Thomas, W. S. Jermyn, J. E. Jones, Ed Whitby and Ralph Lynch. More than 100 operators attended the meeting.

Somerset County Coal Operators' Association, Somerset, Pa., has re-elected its officers as follows: Charles A. Merrill, president, E. A. Siemon, vice president, L. H. Schner, treasurer, and M. L. Markel, secretary.

Western Coal Producers Association has elected the following officers and directors: president, I. N. Bayless, Union Pacific Coal Co., Omaha, Neb.; first vice president, Howard B. Crandell, Clayton Coal Co., Denver, Colo; second vice president, B. P. Manley, Utah Coal Operators Association, Salt Lake City, Utah; and secretary-treasurer, A. L. Vogl, Denver, Colo.

Kentucky River Mining Institute has appointed Robert Dickson secretary-treasurer and safety director. Mr. Dickson formerly was safety director, West Virginia Coal & Coke Corp., and consulting engineer, Robinson & Robinson, Charleston, W. Va.

Western Canada Bituminous Coal Operators Association has named J. J. McIntyre its new president.

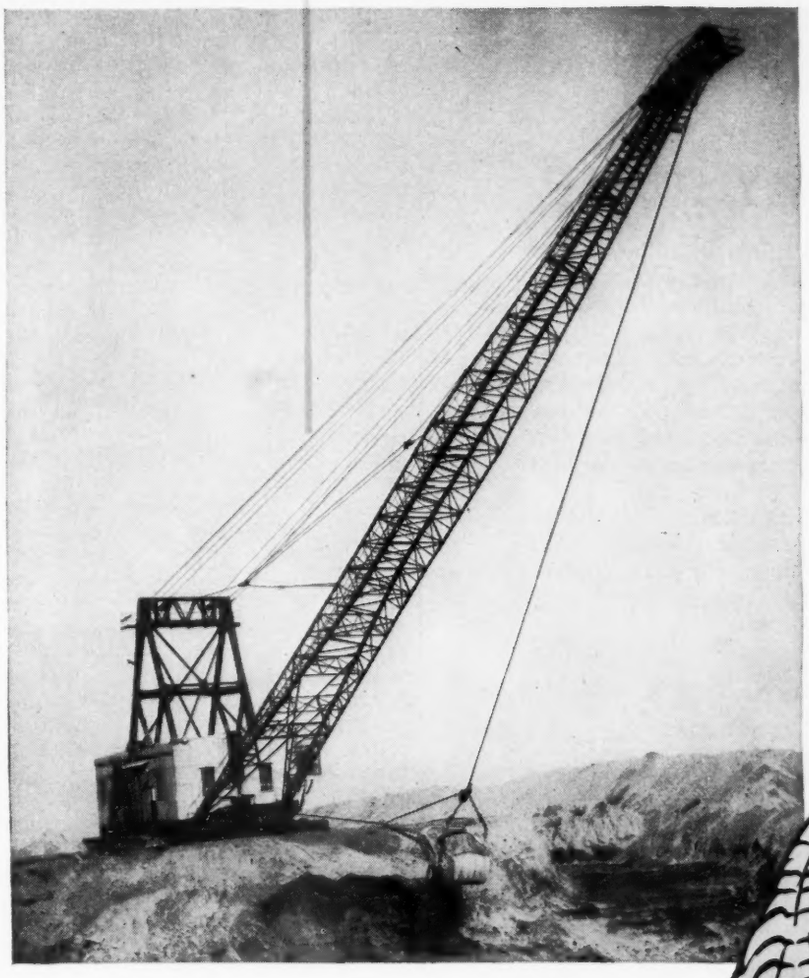
Mining Association of British Columbia, Canada, has elected Dale L. Pitt and T. H. Wilson vice presidents.

men who know the ropes...

take **Tiger Brand**

EXCELLAY PREFORMED

every time!



● Made to close tolerances and unvarying quality standards by the world's largest manufacturer of wire rope, U·S·S American TIGER BRAND Excellay Wire Rope possesses strength, toughness, and flexibility in the right combination to stand up tirelessly under long, hard service. See or call your supplier today. Our wire rope experts are readily available in the field to help you determine your needs and handle out-of-the-ordinary problems. No company offers a more complete engineering service.

IMMEDIATE DELIVERY

...all types and sizes!

EXCELLAY PREFORMED

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
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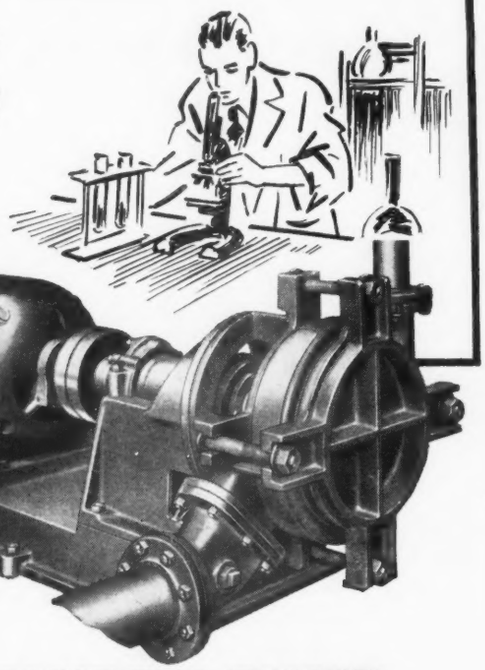
UNITED STATES STEEL

THE BIG DEMAND IS FOR TIGER BRAND

For each type of mixture, parts of different alloys . . . . . .



Assure greater wear resistance to each slurry . . . and longer pump life with less maintenance.

MORRIS

Type R SLURRY PUMP

Naturally, the rate of wear in a solids handling pump is dependent upon the capacity, head and speed. Most pump manufacturers meet these requirements. But Morris gives you something more.

Morris makes its wearing parts in various metals, all differing in composition and hardness. After Morris Engineers analyze your particular slurry, they recommend that metal best suited to your mixture. This assures parts with greater corrosion and abrasion resistance. For example—

One metal used in coal mining installations is Morris Flintmetal "S"—a hard, stainless, high chrome iron, Brinelling between 600 and 700. This metal has greater corrosion and abrasion resistance to slurries containing traces of sulphuric and sulphurous acid.

Other features of the Morris Type R assure longer hours of continuous operation at low cost operation

Easily Dismantled — Impeller and shaft sleeve can be renewed without disturbing the suction and discharge piping.

Gland under suction pressure only — Reduces packing trouble to an absolute minimum. Less leakage, less dilution of mixtures.

Has no internal studs or bolts—This too reduces maintenance trouble and risk of shut-downs.

Shell interchangeable for right or left-hand rotation. Permits 72 different combinations of suction and discharge nozzles.

WRITE US for specifications and operational data on Morris Pumps best suited to your particular needs. Information free.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

MORRIS *Centrifugal Pumps*

Obituary

E. C. Berkeley, 71, general superintendent, Youghiogheny & Youngstown Coal Co., died Feb. 23 at his home in Van, Boone County, W. Va. He had been superintendent for 28 years.

Dr. Rollin T. Chamberlin, 66,inventor of the rockdusting method of controlling coal-dust explosions, died of a coronary thrombosis on March 6 at the Billings hospital, Chicago, Ill.

•

Safety Awards Made by Big Sandy-Elkhorn Group

The annual meeting of the Big Sandy-Elkhorn Mining Institute, held Feb. 27 at the Pike County Country Club, near Pikeville, Ky., was highlighted by a banquet featuring entertainment, presentation of annual safety awards to member mines and the election of new officers. Arthur Bradbury, safety engineer, Inland Steel Co., Wheelwright, Ky., was named president of the group for the coming year, and A. D. Sisk was renamed secretary-treasurer.

For the best 1947 safety record among Class A (larger) mines, the Laviers No. 2 mine of the South East Coal Co., Millstone, Ky., was awarded a bronze plaque. In the Class B group, the Boldman mine of the Utilities Elkhorn Coal Co. received a plaque for top place. Twenty-five foremen employed by member companies were presented with bronze, silver or gold pins for one, two, and three years, respectively, of supervision without an injury to themselves or members of their crews.

It was announced that plaques for mining more than 1,000,000 tons without a fatality were being prepared and would be later presented to the following: Mine Nos. 155 and 204, Consolidation Coal Co. (Ky.); Wheelwright mine, Inland Steel Co.; and Mine No. 2, Princess Elkhorn Coal Co.

During 1947, member companies mined 645,404 tons per fatality, the second best year since 1938.

•

L. & N. Railroad Orders 22 Coal Locomotives

Twenty-two big steam locomotives costing $6,000,000 were ordered March 8 by the Louisville & Nashville R.R. and first deliveries are expected early in the fall. The new locomotives, weighing 223 tons, will be suitable for freight or passenger use but will be used chiefly for hauling coal from southeastern Kentucky. The order has been placed with the Lima-Hamilton Corp., Hamilton, Ohio.

FOR POWER . . . FOR HANDLING EASE

CHAMPION

OF THE FEATHER WEIGHTS

Thor

NO. 28 SINKER ROCK DRILL

(30 Pound Class)

The better the tool the more places you'll find it. That's the secret of the amazing acceptance of the Thor "28"—its exceptionally powerful rotation for such a small and compact drill (30 pounds in 18-¼") have carried its popularity from secondary drilling in the mine and quarry to the general construction field . . . to industries for general maintenance and drilling anchor holes for machinery installations. Try the champion . . . *first.* Call a Thor dealer for a demonstration.

INDEPENDENT PNEUMATIC TOOL CO.

600 W Jackson Boulevard, Chicago 6, Illinois
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EXCEPTIONALLY POWERFUL ROTATION

EASILY REPLACEABLE CHUCK

AUTOMATIC LUBRICATION

FORGED STEEL

FAST BLOWS

Thor **PORTABLE POWER TOOLS**

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

Electro-Magnetic Separators VERSUS

PERMANENT MAGNET SEPARATORS

DON'T BE MISLED!!!

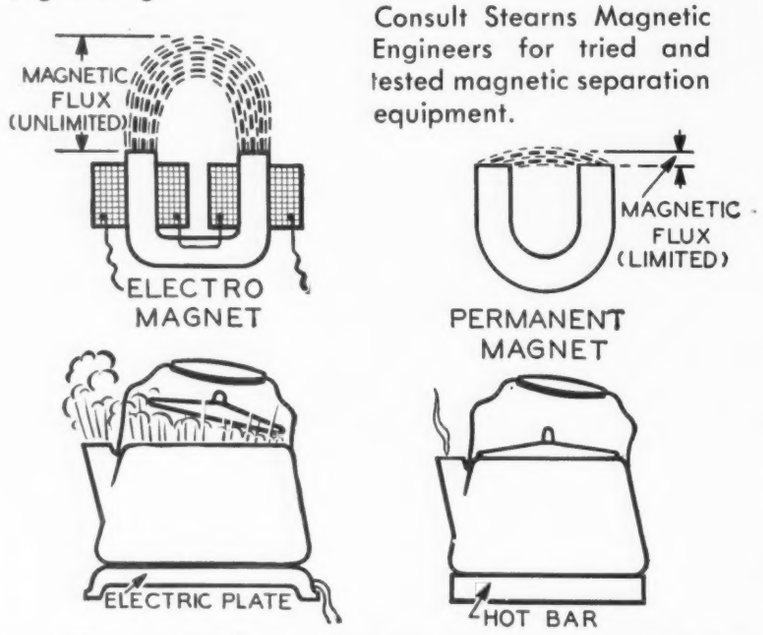
Permanent Magnets have been improved—yes, but they will never be a substitute for a well designed electrically energized magnetic separator for removing dangerous tramp iron from **all materials** under **all conditions.**

We make separators with permanent magnets but only for limited applications.

We cannot jeopardize our reputation as the foremost manufacturers of magnetic separation equipment by recommending permanent magnets for general applications.

Permanent Magnets are not a **panacea** for **all magnetic** separation problems.
Why be a "guinea pig" for innovations in magnetic engineering?

Consult Stearns Magnetic Engineers for tried and tested magnetic separation equipment.



See what we mean? Continuous heat means more power! Likewise, continuous or electrically energized magnets mean greater magnetic flux or power, more efficient separation for you, all of the time. Important for you!

STEARNS MAGNETIC
MANUFACTURING COMPANY
661 So. 28th St. Milwaukee 4, Wis.
Separators • Clutches • Brakes • Magnets

Johnstown Coal Offers Two Mining Scholarships

To encourage younger employees and sons of employees of the company to fit themselves for positions of a supervisory character, the Johnstown Coal & Coke Co., Johnstown, Pa., is offering two college scholarships of $500 each, according to an announcement by Andrew B. Crichton, president.

One scholarship will be offered to employees or their sons in Pennsylvania, one in West Virginia. In West Virginia, the winner will attend West Virginia University, and in Pennsylvania the winner may attend Pennsylvania State College or the University of Pittsburgh. The awarding of the scholarships to the same men for each successive year until the completion of their college course will depend upon the maintenance of satisfactory records. There are no age limits on applicants. Vacation employment in or around the mines will be provided between school terms.

In setting up the plan, the company states that it feels young men accustomed to mines and mining conditions have the most favorable background from which to profit by technical training to fit them for the coal industry. There is a shortage of young trained coal-mining engineers. Coal mining is becoming increasingly technical, and to meet competition and solve technical problems encountered in mining there must be an increasing number of leaders in the coal industry who are technically trained. It is believed that these leaders can be trained from employees of the company and their sons.

•

Hanna Miners Win Safety Slogan Awards

"Safety Round the Clock" copped first honors in the annual safety slogan contest at mines of the Hanna Coal Co., St. Clairsville, Ohio, according to an announcement in the *Hanna News* for February, 1948. The winners, who sponsored the top slogan jointly, were Arlow Heskett, Dun Glen mine, and Robert C. Upchurch, Georgetown mine. The prize for both is an airplane trip to New York City. Other prize-winning slogans were "Security Is Safety," submitted by J. B. Grywalski, Piney Fork No. 1; Ronzel Wease, Bradford; Lewis E. Weiss, Piney Fork No. 4; and Dewey Campbell, Piney Fork No. 1; "Safety Saves Lives, submitted by Wilbur Anderson and C. J. Snyder, both of Willow Grove; "B-Careful-B-Safe," entered by J. E. Briggs Jr., Dun Glen; "Safety Forever," entered by John Rosenek, Dillonvale; and "Safety Comes First," submitted by Dan Rensi, Georgetown Central shop.

Hanna officials pointed out that this was the second year of the annual safety slogan contest. This year, more than 2,000 entries were received as against 500 last year.

a thousand and one job-proved wire ropes

There's a Macwhyte rope that's the right rope for your equipment.

Macwhyte Wire Rope

Use PREformed Whyte Strand for easy handling and longer service.

Macwhyte Distributors and Mill Depots—carry stocks for immediate delivery. Macwhyte representatives will recommend the correct rope for your equipment. Catalog on request.

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Manufacturers of Internally Lubricated Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies.

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NO. 940

Get Greater Safety

plus "the Low Cost of Lifting" with SIMPLEX Mine Jacks

No. 85A Simplex Ratchet Jack Raises Cutter Bar

Choose Simplex Mine Jacks for Safety First in all types of mine jacking. In addition you get easier operation, longer jack life and efficiency to lower your cost of lifting.

Check these important Simplex features: Drop forged, alloy steel heat treated parts — Precision machining — Expansion rivets instead of machine screws — Unbreakable trunions — No fulcrum pins — Maximum strength with minimum weight.

Specify Simplex—get the benefit of the superiority which resulted in these jacks being awarded the *only* gold medal for the safety of jacks by the American Museum of Safety.

GENERAL PURPOSE MINE JACKS

Single Acting — Ratchet Lowering

A Jack for every heavy duty mine job—5-to-35 tons capacity. All lift full capacity on cap or on the toe of Jack, a feature exclusive with Simplex!

WRITE FOR BULLETIN MINES 47

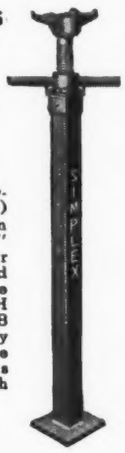
Get this fully illustrated bulletin with detailed information on all Simplex Mine Jacks. In addition to those shown here these include: Post Pullers, Timber Jacks, Electrided Track Jacks, Journal Jacks, Anchor Jacks, Wire Tensioning Jacks, and the Simplex-Jenny Center Hole Hydraulic Puller.

Adjustable MINE ROOF JACKS

M8, M9, M16 and M17

3 Types of Heads

Type "FS" Flat Swivel (on Jack at right) for use with wooden pieces. Type "C" (above left) for square and round timbers, and Type "FF" for small H beams and rails. 8 and 16-ton capacity models with square tubing or fittings only for use with round pipe.



Simplex PIN-UP JACKS

8 and 16-ton capacities with new type "FL" head—flat with lugs—for square tubing and round pipe. Eliminates the danger of knocking out posts. Enables loading machines to load out full cut. Unnecessary to re-set jack.

GEARED JACKS 25 and 35-ton capacities. For heavy duty work such as rerailing mine railroad cars. Built for power, speed, ruggedness.

HYDRAULIC JACKS 3 to 100-ton capacities. Safety tested to 50% over capacity. Easy to operate, vertically or in horizontal position.

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

TEMPLETON, KENLY & CO.
1040 South Central Avenue, Chicago 44, Illinois

Princess Elkhorn Alters Scholarship Plan

Changes in the scholarship plan of the Princess Elkhorn Coal Co., Huntington, W. Va., expanding the engineering awards to include mechanical and electrical as well as mining engineering and adding a new scholarship for teaching or the ministry, will become effective this year, it was announced recently by company officials.

In a letter to all employees, David L. Francis, president of the company, outlined the new plan as follows: (1) Two boys who are sons of company employees will be offered four-year scholarships to the University of Kentucky, with an option of taking mining, electrical or mechanical engineering. (2) An additional scholarship will be awarded for the state university or any other college in the region to any student, boy or girl, in Floyd or Johnson County, regardless of whether the parents are connected with the company; the winner may take any of the engineering courses or a course in teaching or religion. (3) Two two-year scholarships will be offered to girls who are daughters of employees for attendance at Pikeville College.

Purpose of the scholarship plan, as reviewed by Mr. Francis, is to encourage higher education among employees' children, with a view to better community citizenship, and to develop skilled mining men who will continue to work for the company after they have finished school. Selection of scholarship winners is based on a review of the applications by company officials and on the advice of school principals and local teachers.

•

Green River Valley Group Organized in Kentucky

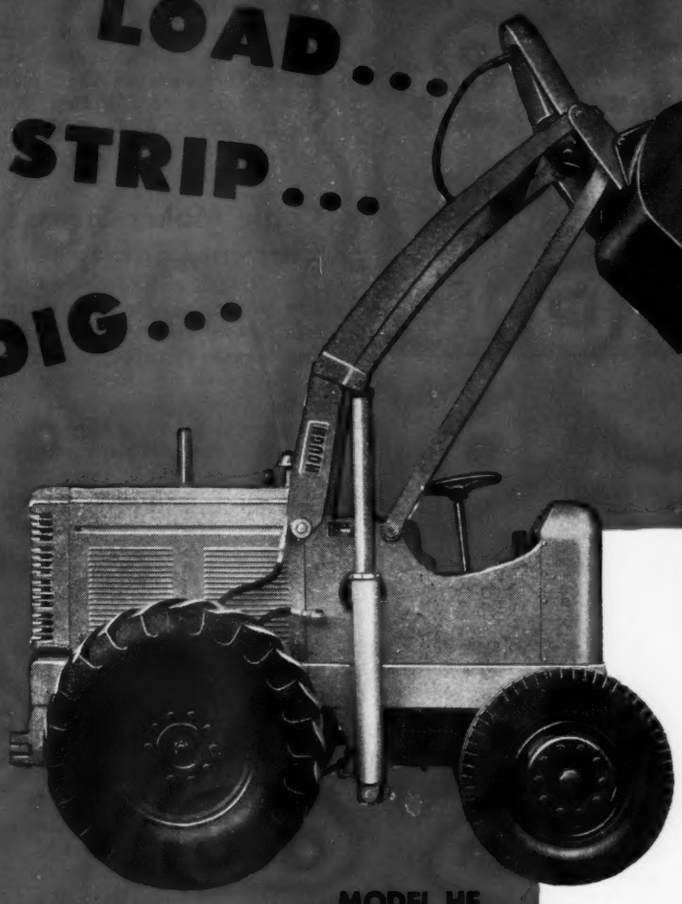
The Green River Valley Mining Institute was organized at a meeting in Greenville, Ky., Jan. 27, to promote and develop new mining methods, better safety programs, closer cooperation between management and employees and better public relations.

Arthur M. Wilson, superintendent, W. A. Wickliffe Coal Co., Browder, was elected president. Mr. Wilson was president of the Western Kentucky Mining Institute last year. Other officers include Ward Padgett, superintendent, Crescent Coal Co., Central City, vice president; L. S. Loving, manager of the Central City office of Jones and Donan, secretary-treasurer; Robert J. Hagan, engineer, Crescent Coal Co., assistant secretary-treasurer.

Regular meetings are to be held on the fourth Tuesday of each month at the Junior Chamber of Commerce Clubhouse, Greenville. An interesting and varied program is planned for each session, with at least two meetings during the year devoted to the display of models and operating ideas

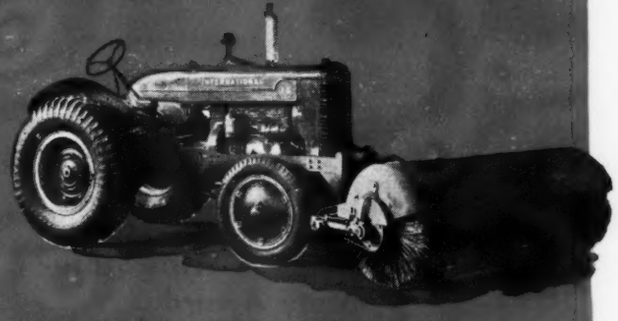
LOAD... STRIP... DIG... BULLDOZE with a

HOUGH
SAY "HUFF"
PAYLOADER
PATENT 2,412,323



MODEL HF PAYLOADER ¾ yard capacity

MODEL HL PAYLOADER 1 yard capacity



HOUGH TRACTOR SWEEPERS clean the last of the dirt and dust from top of strip pit seams. Available for International and Case Industrial wheel tractors. Sizes 6 and 7 feet.

Rubber-tired Power for Many Jobs!

Payloaders are complete Hough built pneumatic tire tractor shovels that are proving their usefulness at both strip and underground mines. At strip pit mines their superiority has been established for the job of removing the last few inches of overburden from the coal seam. They dig fast and carefully and do not chop or cut up the coal . . . dump their loads directly into trucks or carry them to disposal points. They also load coal, handle spoil, grade paths for draglines, build and maintain haulage roads, move drills, cable and junction boxes, remove snow, etc. Around underground mine properties these versatile shovels have made themselves indispensable for many loading, leveling, clean-up, hauling, pushing, snow-removal and other tasks.

Full information on the entire line of Hough Payloaders is yours for the asking. It will pay you to get complete facts, literature and the name of your Hough distributor.

THE FRANK G. HOUGH CO.

735 Sunnyside Ave. Libertyville, Ill.

TRACTOR SHOVELS SINCE 1920

•HOLMES EQUIPMENT

• *Designed for . . .*

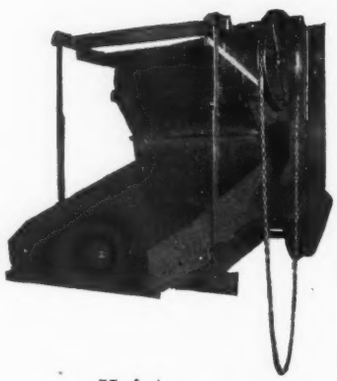
MODERN MINING

Overturning Cage

Dumps through 130° arc; permits use with solid end cars, and assures cleaning of cars. Has added advantage of elimination of maintenance on car doors.

Holmes Dust-O-Lator

This is a self-contained unit, combining a withdrawal gate, mechanical screen, and automatically controlled power unit for use in removing objectionable dust and fines from the coal as it flows to the truck.



Hoists

Custom built to suit local conditions; available for steam or electric power from fifty horsepower up.

Cast Spoke Sheave Wheels

These cast, all-steel spoke sheave wheels may be had in a wide range of sizes, for either single or double strand operation. Full machine turned in the groove for long rope life.

We solicit steel plate work, steel fabrication, special machine work, grey iron casting and pattern work. Write today for Catalog C-200.

ROBERT HOLMES AND BROS.

BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES

DANVILLE, ILLINOIS

originating in the mines of the Green River area.

The Institute is open to all interested in the advancement of mining, and it is reported that membership now totals over 250 men. Address of the Institute is P. O. Box 328, Central City, Ky.

•

Cable Maker Stresses Care and Safety

A widespread campaign to encourage proper care and handling of cables in coal mines for longer cable life and workers' safety is scheduled to be launched in April by the Rome Cable Corp., Rome, N. Y. The campaign will take the form of an advertisement every three months covering different aspects of the care of cables. Reproductions of these advertisements in poster form will be available for display in and around coal mines. The first in the series is entitled "A Better Angle on Cable Flexing." Each advertisement will include a return coupon for use in requesting extra copies.

•

Borough's Anthracite Strip Law Is Voided

A borough ordinance adopted Nov. 29, 1946 in Shenandoah, Pa., requiring stripping operators to file a $10,000 bond for each acre of land to be stripped was declared null and void in a decision on March 9 by Schuylkill County Common Pleas Judge Vincent Dalton. The bond was imposed to guarantee filling in and landscaping worked-over lands.

The fight against the law was launched by the Shen-Penn Production Co., subsidiary of the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., in connection with plans to strip 220 acres in the borough.

On the same date in Wyoming Borough, it was learned that the local council had tabled a plan to levy a 10c tax on each ton of coal "mined, removed, stripped, screened or prepared for market" within that borough. The move to table was acted on after representatives of the Anthracite Institute had labeled the proposal "an unwise and short-sighted policy." The tax would have brought in an estimated $2,800 annually.

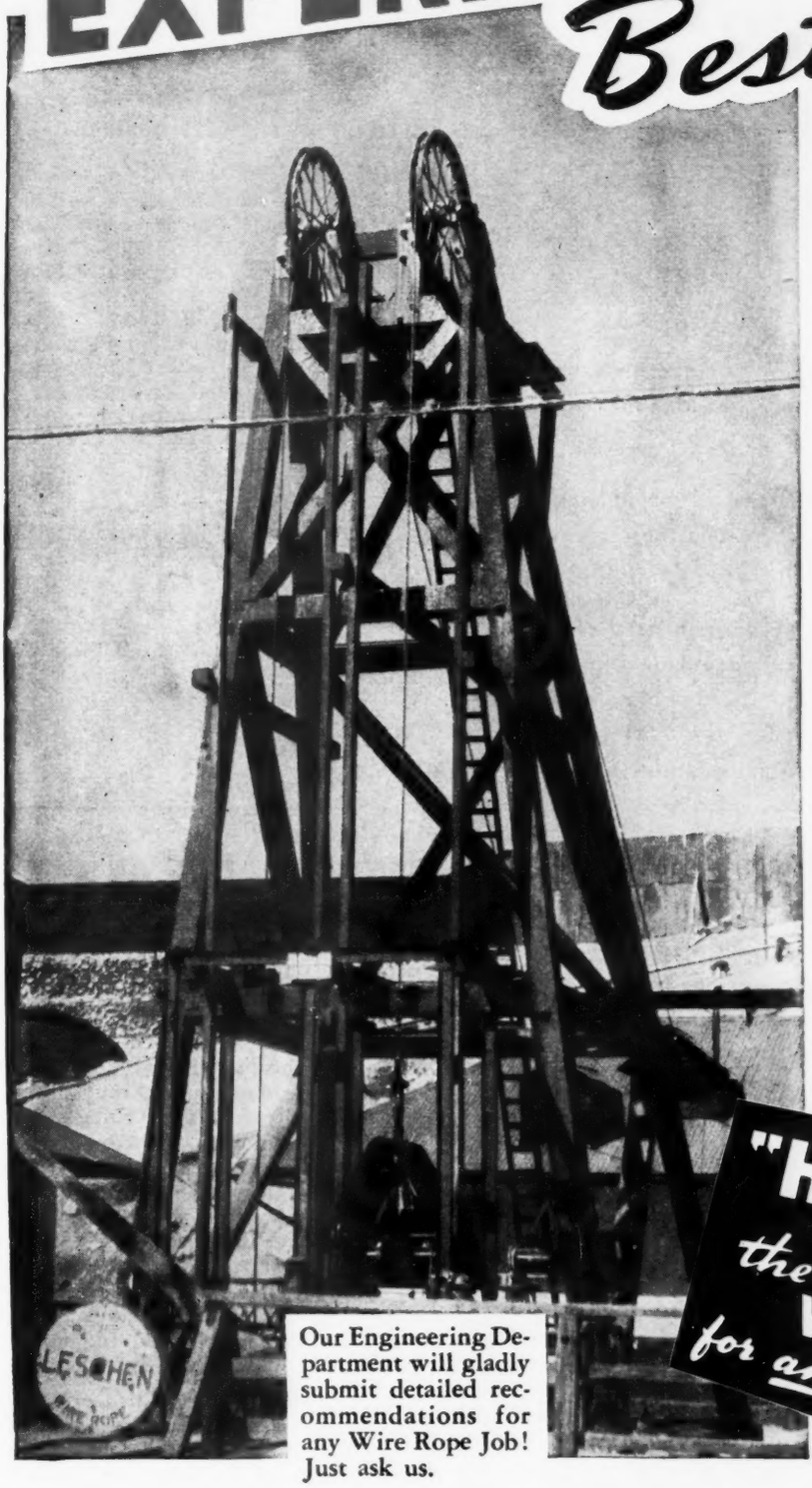
Earlier, in Mahoning township, Pa., the school district took under advisement a proposal to impose a 5c tax on coal and limestone mined or quarried in the district.

•

Company Wins State Safety Award

The Buckingham Coal Co., Congo, Ohio, has won for the second straight year a safety award given by the Ohio State Industrial Commission "for outstanding efficiency and achievement by the supervisory forces and employees."

EXPERIENCE *is The Best* GUIDE!



Men who operate mining equipment, need not be reminded of the important part that wire rope plays in determining their final production costs.

Experience has proved that the longer a rope lasts, the lower is its cost per unit of work done. Less time, too, is wasted in making replacements.

It is *also the experience* of a large number of Wire Rope users that they can depend on Preformed "HERCULES" (Red-Strand) Wire Rope for top-flight performance. Its toughness . . . its easy spooling . . . its unusual endurance—make for longer life, faster work, and lower operating cost.

Our Engineering Department will gladly submit detailed recommendations for any Wire Rope Job! Just ask us.

"HERCULES"* (RED STRAND)
the **DEPENDABLE WIRE ROPE** *for any* **TOUGH JOB**

* REG. U.S. PAT. OFF.

MADE ONLY BY

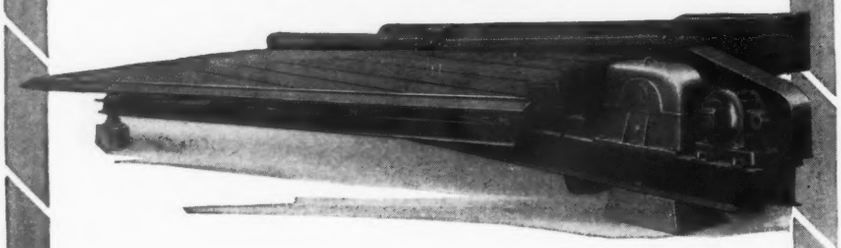
A. LESCHEN & SONS ROPE CO.

ESTABLISHED 1857

5909 KENNERLY AVENUE • ST. LOUIS 12, MISSOURI

NEW YORK • CHICAGO • DENVER • SAN FRANCISCO • PORTLAND • SEATTLE

SuperDuty COAL WASHING TABLES PROFITABLE IN ANY SIZE PLANT



You do not need to be a big operator to make an extra profit by the use of one or more SuperDuty Diagonal Deck Tables.

Hundreds of these amazing coal washers are being used profitably in small capacity plants where one table cares for the entire washed coal production.

The big advantage lies in the fact that washed sizes, prepared on the SuperDuty Table, command a higher price and find a wider range of usefulness. The operating and maintenance costs, including depreciation, are quickly absorbed; such fully prepared sizes are more easily sold at better prices; and your costs of production and sales are reduced by substantial margins.

For full information write for Bulletin 119.

CONCENCO FEED DISTRIBUTOR

The Concenco Revolving Feed Distributor is a heavily fabricated, all steel machine, with motor drive requiring only ¾ H.P. in operation. This distributor effectively provides a splitting of feed into any desired number of equal portions. It is especially suitable for feeding efficiently a battery of coal washing tables.

THE DEISTER ★ CONCENTRATOR COMPANY
903 Glasgow Ave. • Fort Wayne, Ind., U.S.A.
CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

Mine Inspectors Group Change Meeting Plans

The 38th Annual Convention of the Mine Inspectors Institute of America will be held June 7, 8 and 9, at the Neil House, Columbus, Ohio, accordto a recent announcement by C. A. McDowell, secretary. The meeting had originally been planned for June 10, 11 and 12, at Springfield, Ill.

•

Three Mine Officials Fined in Blast Trial

Three mine officials were fined $500 and costs and a fourth was given a suspended sentence by Judge J. Harold Flannery in Wilkes-Barre, Pa., March 10, on charges growing out of an explosion that killed eight miners last Dec. 11 at the Franklin colliery, Lehigh Valley Coal Co. Those fined were: J. P. Daley Jr., Luzerne, mine foreman; Frank Danna, Wyoming, assistant mine foreman; and T. W. Jones, Kingston, assistant mine foreman. Harry Sparke, Carverton, superintendent of the colliery, was given a suspended sentence because of "mitigating circumstances" and "reasonable doubt."

Arrested on bench warrants asked by the State Department of Mines after study of a report submitted by three inspectors, the mine officials all had pleaded "no defense" when arrainged before Judge Flannery.

•

Preparation Facilities

Cambria-Clearfield Mining Co., Mine No. 6 St. Benedict, Pa.—Contract closed with K. Prins & Associates for complete three-track tipple and washery, handling 250 t. p. h. from run-of-mine belt conveyor; coal to be prescreened at 3 in.; 3-in.-plus hand-picked on a horizontal shaking flattop picking table; 3x0-in. rescreened over Robins vibrating screens for removal of the minus ¼-in.; 3x¼-in. to be washed in two 100 t. p. h.-capacity Prins coal washers; washed coal to be handled over Robins 5x14-ft. 2½-deck dewaterizers for sizing and removal of the water from washed coal and sludge; complete mixing facilities to be provided for loading washed and hand-picked coal.

Springfield Coal Co., Mine No. 4, St. Benedict, Pa.—Contract closed with K. Prins & Associates for complete three-track tipple and washery, handling 250 t. p. h. from run-of-mine belt conveyor; coal to be prescreened at 3 in.; the 3-in.-plus hand-picked on a horizontal shaking flat-top picking-table; 3x0-in. rescreened over Robins vibrating screens for removal of the minus ¼-in.; 3x¼-in. to be washed in

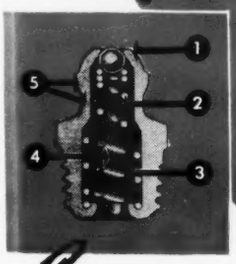
Announcing the New and Improved

LINCOLN

KLEENSEAL FITTING

BULLNECK TYPE

The Hydraulic Fitting with a SURFACE CHECK...



Check **These Features:**

1. ... **Flush Ball Check** — Head can be wiped clean without forcing dirt into fitting and into bearing.
2. ... **Large Grease Passage**—The larger internal diameter permits greater flow of lubricant.
3. ... **Special Spring Design**—Spring cannot be compressed to restrict flow of the heaviest lubricants.
4. ... **Greater Flow—Less Resistance**—The larger internal area requires less pressure to clear the fitting.
5. ... **Sturdier Construction**—Enlarged neck size and projecting locking pad protect against damage and wear.

These Grease Fittings (Bullneck Type), were originally developed by the Lincoln Engineering Company for the United States Army Ordnance Department. They incorporate the most desirable characteristics of former types of high-pressure fittings and permit standardization of one, all-purpose fitting (Bullneck Type). They represent the first major improvement in grease fitting design that does not obsolete couplers and grease guns in general use today—they can be securely contacted by all commercial hydraulic couplers.

Efficient lubrication is the means for CUTTING COSTS and getting GREATER PRODUCTION. Ask your Wholesaler about Lincoln Lubricating Equipment—Everything from Grease Fittings to Complete, Automatic, Centralized Lubricating Systems.

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LOS ANGELES—Lincoln Engineering Co., of Calif.—Richmond 0151
CLEVELAND—Lincoln Lubricating Systems, Inc.—Express 4334
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for DUMMIES THAT CAN "TAKE IT"
WET or DRY . . .
SEAL-TITE TAMPING BAGS
for Doubled Protection from Breaking and Spilling
HIGH WET STRENGTH
SEALTITE KRAFT
SAFETY SEAM

Streamline blasting procedure with dummies made-up with Seal-Tite Tamping Bags. They're extra-tough to take the added strain of greater bulk and the rougher handling those big dummies get.

Time, labor and costs are saved with supplies of dummies quickly and simply made up by unskilled help. They're always handy and ready for use. They can be stored safely without special precautions because they're all-weather bags. Their high wet-strength and safety-seam protect them from breaking and splitting.

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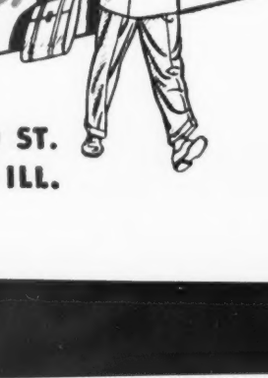
We'll send you samples of Seal-Tite Tamping Bags to try out — in the sizes you need — or in an assortment. Yours for the asking.



Tamping Bag Co.

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two 100-t. p. h.-capacity Prins coal washers; washed coal to be handled over Robins 5x14-ft. 2½-deck dewaterizers for sizing and removal of the water from washed coal and sludge; complete mixing facilities will be provided for loading washed and hand-picked coal.

Cameo Coal Co., Cameo, W. Va.—Contract closed with Jeffrey Mfg. Co. for unit washer; 150 t. p. h. raw-coal feed, 6x¼ in.

Lorado Coal Mining Co., Lorado, W. Va.—Contract closed with Jeffrey Mfg. Co. for retarding conveyor; 300-t. p. h. raw-coal feed, run-of-mine.

Crooked Creek Coal Co., Logan W. Va.—Contract closed with Jeffrey Mfg. Co. for tipple equipment; 100-t. p. h., run-of-mine.

Jones & Heatherman Coal Co., Peach Creek, W. Va.—Contract closed with Jeffrey Mfg. Co. for tipple alterations; 200-t.p.h., 6x0 in.

Kanawha Coal Corp., Eskdale, W. Va.—Contract closed with Jeffrey Mfg. Co. for unit washery; 75 t.p.h. 5x¼ in.

Black Eagle Smokeless Coal Co., Black Eagle, W. Va.—Contract closed with Jeffrey Mfg. Co. for tipple equipment; 250-t.p.h., run-of-mine.

Phoenix Coal Co., Phoenix Park, Pa.—Contract closed with Wilmot Engineering Co. for two 5-ft. diameter Wilmot Hydrotators for stove and nut coal, total feed capacity, 180 t.p.h.; and two 5-ft.-diameter Wilmot Hydrotators for pea and buckwheat No. 1 coal, total feed capacity, 130 t.p.h.; and two 5-ft.-diameter Wilmot Hydrotators for rice and barley coal, total feed capacity, 110 t.p.h.

Rhoads Contracting Co., Lykens Breaker, Ashland, Pa.—Contract closed with Wilmot Engineering Co. for one 12-ft.-diameter Wilmot Hydrotator classifier to prepare No. 5 coal, feed capacity, 50 t.p.h.

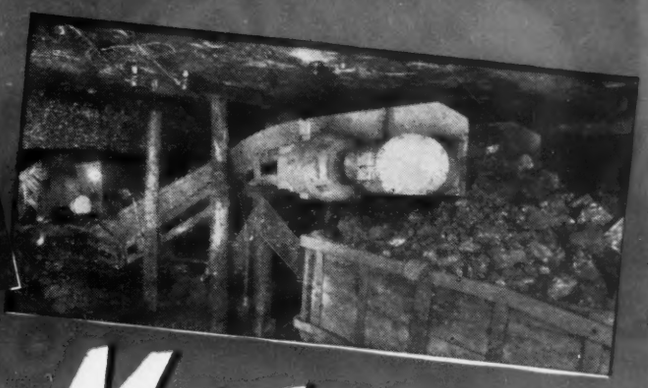
Jacob Dailey, Bloomsburg, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal-Deck No. 7 coal-washing table for cleaning No. 4 buck.

Roden Coal Co., Marvel, Ala.—Contract closed with Deister Concentrator Co. for two SuperDuty Diagonal-Deck No. 7 coal-washing tables and one CRF-105-A Concenco revolving feed distributor; tables to clean 3/8x0-in. coal.

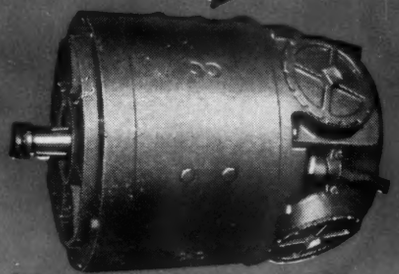
DeBardeleben Coal Co., Sipsey, Ala.—Contract closed with Deister Concentrator Co. for four SuperDuty Diagonal-Deck coal-washing tables for handling ½x0-in.

Republic Steel Corp., Russellton, Pa.—Contract closed with Deister Concentrator Co. for 16 SuperDuty Diagonal-Deck No. 7 coal-washing tables and two CRF-105 Concenco revolving feed distributors, eight-

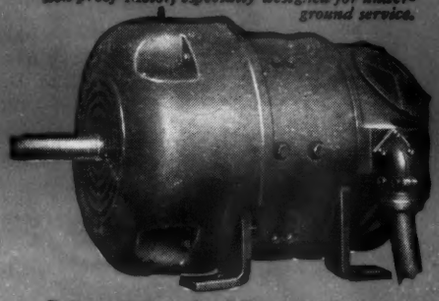
For the TOUGHEST jobs in mining...



TOUGH MOTORS by RELIANCE



Reliance Fully-enclosed Non-ventilated, Explosion-proof Motor, especially designed for underground service.



Reliance Fully-enclosed, Fan-cooled D-c. Motor for use where permissible equipment is not required.

Reliance Fully-enclosed, Fan-cooled D-c. Mine Motor for use on permissible underground equipment.

The most effective protection possible against coal dust, moisture and other hazards encountered in the toughest mining jobs makes the motors Reliance builds especially for this service, the very toughest that money can buy. That's why you can depend on any one of them for a longer life of dependable performance—with far less maintenance.

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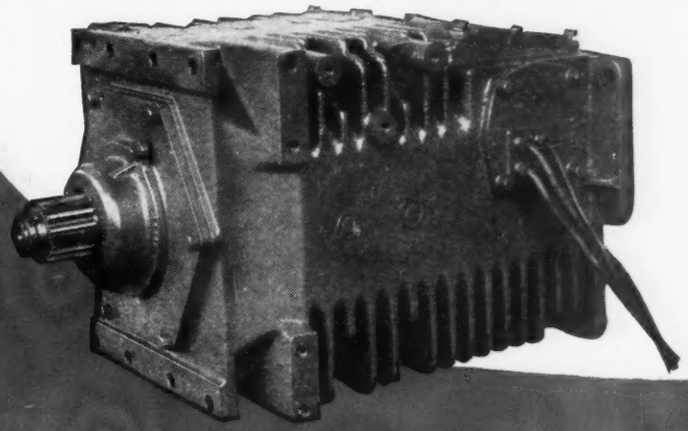

Reliance D-c. Explosion-proof Mine Motor, especially designed for loading equipment.

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Makes Coal Mining EASIER... FASTER...and SAFER
WOOD'S
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WEIGHT
ALUMINUM ALLOY SHOVEL
Non-Corrosive
Non-Sparking!
ALL METAL PARTS MADE OF ALUMINUM
2 to 3 Pounds LIGHTER than Steel
Wood's new ZEPHYR Weight Coal Shovel is a revolutionary contribution to more efficient, less hazardous coal mining. Its lightweight aluminum alloy blade eliminates 2 to 3 pounds "dead weight" from every stroke. This blade, too, is non-sparking—an invaluable safety factor. Unaffected by sulphur water or other corrosive agents, the Wood's ZEPHYR Weight Coal Shovel gives much longer service . . . affords true final-cost economy . . . See your Wood Jobber now!
A NEW SHOVEL DEVELOPMENT BY
The Wood Shovel and Tool Company, Piqua, Ohio
WOOD
Specialists in Shovels, Spades, Scoops

way split; tables to handle the ¼ x 0-in.

Midwest Radiant Corp., Millstadt, Illinois.—Contract closed with Deister Concentrator Co. for four No. 7 SuperDuty Diagonal-Deck coal-washing tables for cleaning sludge from present washer.

Rochester & Pittsburgh Coal Co., Lucerne Plant, Homer City, Pa.—Contract closed with Deister Concentrator Co. for 18 No. 7 SuperDuty coal-washing tables and three Concenco revolving feed distributors; tables to clean ¼ x 0-in.

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Coal Publications

Outcrop and Underground Mine Fires in Allegheny County, Pa., by G. W. Grove and E. E. Quenon. U. S. Bureau of Mines, Washington 25, D. C., I. C. 7434. 6 pp. 8x10½-in.; paper; mimeo. Free. Brief accounts of 11 mine fires now burning, with comments on property damage and injury to health.

Mine Man-Trip and Ambulance Cars, by M. J. Mechling and H. J. Sloman. U. S. Bureau of Mines, Washington 25, D. C., I. C. 7435. 6 pp. plus 11 pp. of illustrations. 8x10½-in.; paper; mimeo. Free. Detailed information on cars now in underground service for man-trips and transportation of injured persons.

Three Technical Papers prepared by the Bureau of Mines now are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at prices quoted below. Booklets are 6x9 in., paper-bound. Titles are as follows:

T.P. 701, Preparation Characteristics of Maryland Coals, by W. L. Crentz and Thomas Fraser. 65 pp. 15c.

T.P. 702, Effect of Oxidation Upon the Carbonizing Properties of Pocahontas No. 3- and No. 4-Bed Coals from Eastgulf, Raleigh County, W. Va., by J. D. Davis, D. A. Reynolds, R. E. Brewer, B. W. Naugle and D. E. Wolfson. 18 pp. 10c.

T.P. 707 Minable Reserves, Petrography, Chemical Characteristics and Washability Tests of Coal Occurring in the Coos Bay Coal Field, Coos County, Oregon, by A. L. Toenges, J. J. Dowd, L. A. Turnbull, J. M. Schopf, H. M. Cooper, R. F. Abernethy, H. F. Yancey and M. R. Geer. 56 pp. 50c.

Safety Catches on Mine Cages and Methods of Testing Them, by D. Harrington and J. H. East Jr. U. S. Bureau of Mines, I. C. 7436. 43 pp. plus illustrations. 8x10½-in.; paper; mimeo. Free. Weaknesses in methods of testing safety catches on hoisting cages are pointed out. Manufacturers are urged to develop safety devices that will always work and the need is

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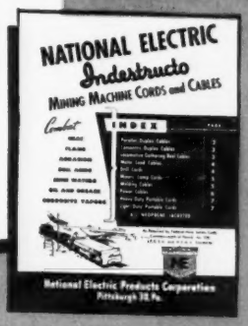
LOCOMOTIVE GATHERING CABLE



Write for illustrated MINING CABLE Catalog.

See the new "MINING CATALOGS" for National Electric specification insert.

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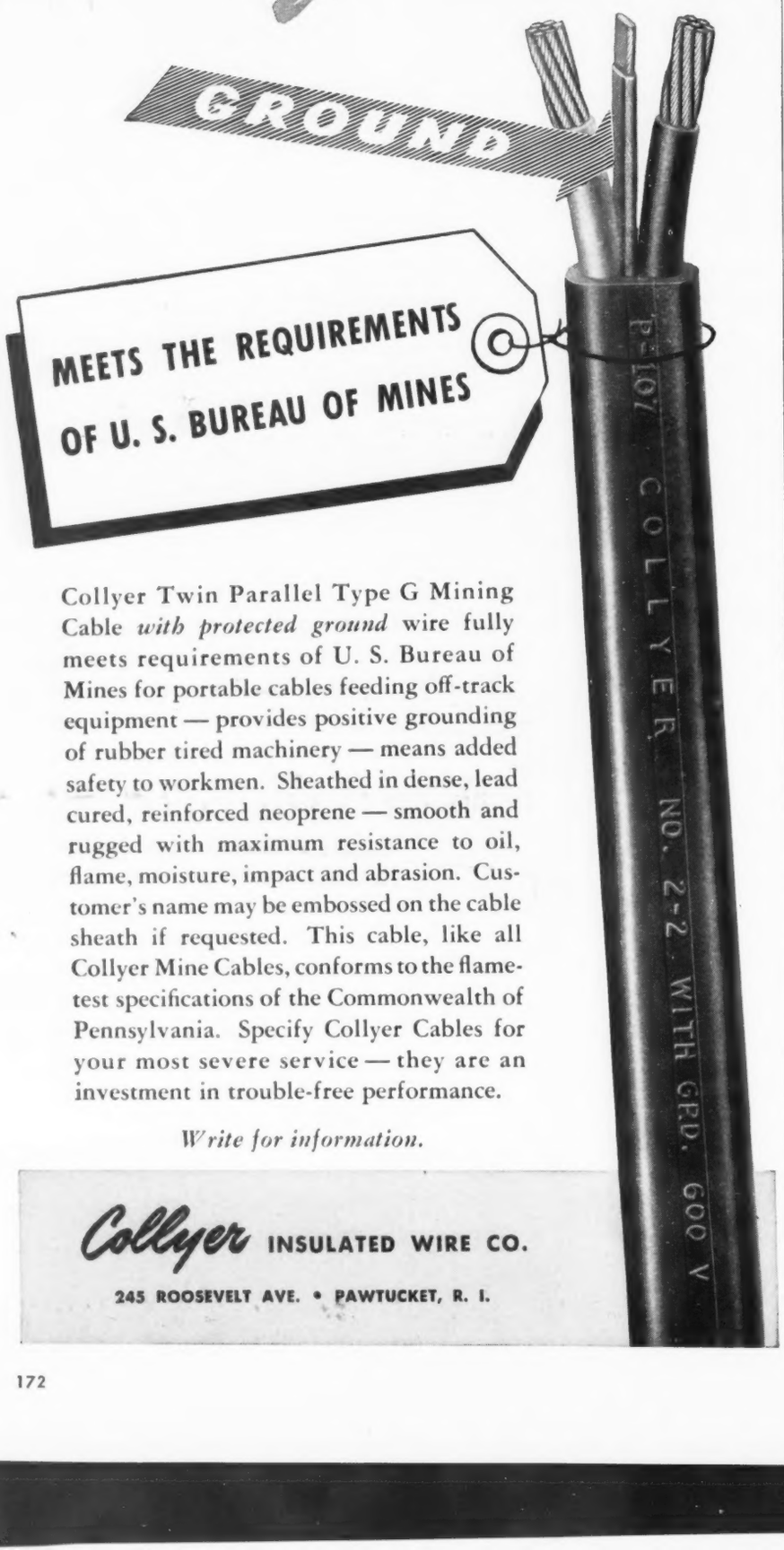

Collyer Twin Parallel Type G Mining Cable *with protected ground* wire fully meets requirements of U. S. Bureau of Mines for portable cables feeding off-track equipment — provides positive grounding of rubber tired machinery — means added safety to workmen. Sheathed in dense, lead cured, reinforced neoprene — smooth and rugged with maximum resistance to oil, flame, moisture, impact and abrasion. Customer's name may be embossed on the cable sheath if requested. This cable, like all Collyer Mine Cables, conforms to the flame-test specifications of the Commonwealth of Pennsylvania. Specify Collyer Cables for your most severe service — they are an investment in trouble-free performance.

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stressed for testing methods to show when hoisting ropes should be replaced.

Tests in the Experimental Coal Mine to Determine Requirements for Preventing Propagation of Coal-Dust Explosions in Rooms, by H. C. Howarth, John Nagy, Irving Hartmann, H. P. Greenwald and Bernard Lewis. U. S. Bureau of Mines, R. I. 4195. 12 pp. plus illustrations. 8x10-in.; paper; mimeo. Free. Results of this investigation justify the following conclusions: (1) rock dust carried to within 80 ft. of the face will not prevent propagation of coal-dust explosions in such workings; (2) a minimum of 65 percent incombustible in the dust must be maintained to within 40 ft. or less of the working face; and (3) bag-type rock-dust protective devices thus far tested do not prevent propagation of explosions either between connecting rooms or from rooms into entries.

Heating-Value Loss of Coal on Air-Drying, by H. M. Cooper, E. C. Tarpley and R. F. Abernethy. U. S. Bureau of Mines, R. I. 4197. 6 pp. 8x10½-in.; paper; mimeo. Free. Air drying causes little loss of heating value in low-volatile bituminous but high-volatile C bituminous and subbituminous B coals are oxidized slightly with some slight loss in heating value. Heating-value determination of low-rank coals should be made as quickly as possible after collection of samples.

American Standard Safety Code for Conveyors, Cableways and Related Equipment (B20.1-1947). American Standards Assn., 70 East 45th St., New York 17, N. Y. 53 pp. 5¼x7¾-in.; paper. 90c. In view of new hazards due to the growing use of mechanical conveyors, the American Standards Assn. has designed this code to guide state authorities in making safety regulations and industries that use conveyor machinery and equipment. Information on design, installation, operation and maintenance of power conveyors, gravity conveyors, pneumatic tubes, tiering conveyors, cableways, etc.

Resume of Bureau of Mines Research and Development Work on Western Coals, 1942-47, by V. F. Parry. U. S. Bureau of Mines, R. I. 4171. 9 pp. plus 8 pp. of illustrations. 8x10½-in.; paper; mimeo. Free. Discovery of two important new reserves of coking coal—the Willow Creek bed at Kemmerer, Wyo., and a deposit in Gunnison country, Colo.; data showing that coking coal is relatively scarce in the West but that an abundant supply of weakly coking coals is available; methods for safe storage of sub-bituminous coal; information on drying, combustion and gasification of low-rank coals; summary of investigations in progress at Bureau laboratories at Golden, Colo., and Grand Forks, N. D.

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All "Tool Steel" parts are guaranteed to handle more coal than any other products used in the same service.
Their maintenance records show a superiority of trouble-free service that in many cases exceeds a ratio of 13 to 1.
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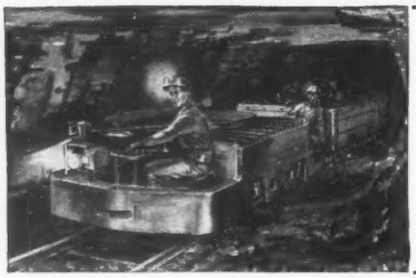


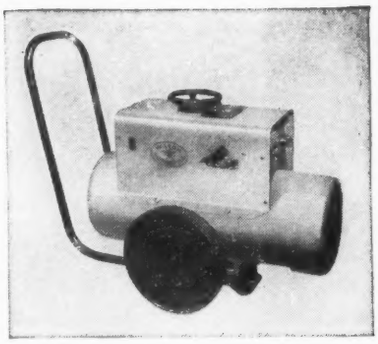
Equipment News

More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

Earthmover

Its new 200-hp. Terra-Cobra high-speed self-propelled earthmover, Model TC-S14, has been recently developed to meet the demand for greater power on earthmoving operations, according to the Wooldridge Mfg. Co., Sunnyvale, Calif. This increased power is said to enable the new unit to climb steeper grades and traverse soft mud, sticky clay and loose sand under heavily loaded conditions with ample tractive pull and minimum gear shifting.

In addition to the regular Terra-Cobra features, Model TC-S14 incorporates a larger clutch and heavier-duty transmission to deliver maximum power on the drive wheels. A large 17-in. clutch of the single-plate dry-disk non-adjustable type automatically compensates for facing wear, and high-capacity constant-mesh helical gears in the transmission insure faster shifting and smoother performance, the company states. The unit has four forward speeds up to 17 m.p.h. fully loaded and one speed reverse. The scraper bowl has a heaped capacity of 17½ cu. yd.; 14 yd. struck. Heavy-duty air brakes actuate simultaneously on the rear wheels of the scraper, assuring full and complete control of the Terra-Cobra at all times, and split-second control of the cutting blade, apron and positive-tilt forced-load ejector is provided, it is said.

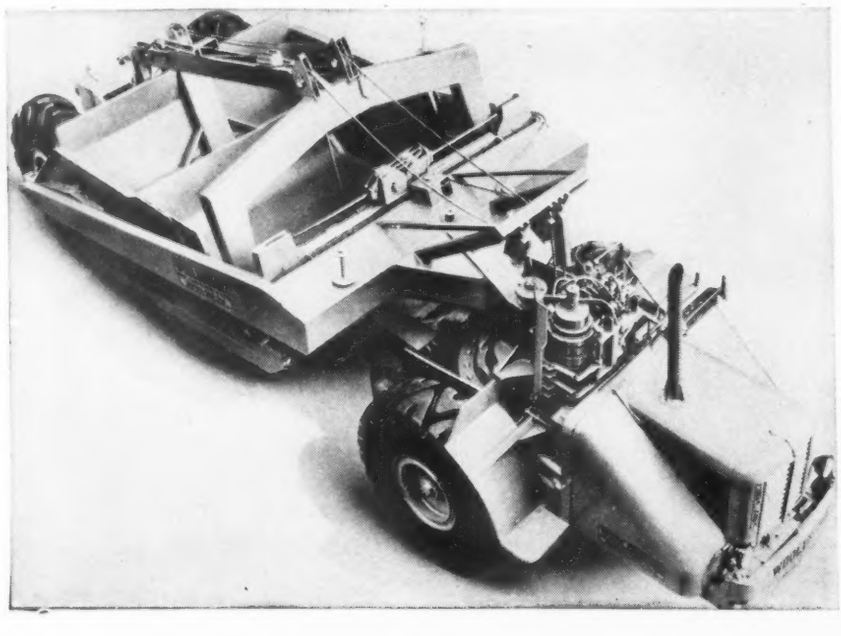


ARC WELDER—New "Hornet" 36A available in 200-, 300- and 400-amp. models is a heavy duty m.g. arc welder with a simple current control easy to adjust and preset accurately, according to Wilson Welder & Metals Co., Inc., New York 17. Smaller in size and weighing one-third less than previous Hornet models, the unit is designed for either 220 or 440 volts and requires no change in relays or additional wires for voltage reconnection.

Current-Leak Detector

A new leak detector permitting quick and positive determination of leakage currents in d.c. power-distribution systems with grounded return, has been announced by Mosebach Electric & Supply Co., 1115 Arlington Ave., Pittsburgh 3, Pa. Known as the "Bucher Leak Detector and Line Indicator, Form A," the unit is said to indicate when an electrical circuit is safe or unsafe by measuring the leakage currents from the ungrounded side of the circuit. Because it is primarily a means of detecting the condition of the insulation and warns of loss in insulation efficiency before total breakdown occurs, the detector serves to prevent electrical fire and shock hazards.

Readings are readily indicated by the intensity and non-lighting of the red and green lights. The unit is placed near the line switch and readings are made with the line switch open. It is used where no load, lights, or heaters are left on the circuit when the line switch is open. It also is said to be highly useful in showing the location of line switches and for determining whether a line switch is open or closed. Other uses include indication of the presence of undesired load on the circuit, to warn of fallen wiring that may occur between scheduled inspections and also as a shop or field tester for borehole cables and for individual operating units.



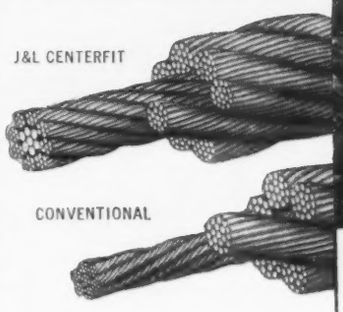
Cable

A new non-metallic sheathed cable, known as "RoFlex," has been announced by the Rome Cable Corp., Rome, N. Y. Its individual conductors, insulated with Rome Synthinol thermo-plastic compound, are said to be permanently colored for easy and quick circuit identification and to be highly resistant to oils, acids, alkalies, moisture, and flame. The insulation strips easily, exposing bright copper conductors for quick and positive con-

66% Longer Service Life with NEW J&L Center Fit Wire Rope

J&L STEEL

All 17 strands in CenterFit are laid up in a single closing operation. Note all strands run in the same direction. Outside strands fit snugly into valleys between inside strands and eliminate crossing of strands as in conventional design. This prevents internal nicking—gives longer wear. Eight outside strands, CenterFit design, give more steel, less void space, greater flexibility, easier handling.



. . . Sets performance record of 15 weeks continuous service on this fast shovel

When a CenterFit wire rope hoisting line on one of the fastest power shovels in the industry recently completed 15 weeks of continuous service, it set a performance record that will interest every wire rope user.

Here are the facts:

OPERATION—Removing overburden at strip coal mine near McDonald, Pa.

CONTRACTOR—Allegheny Contracting Company, Pittsburgh, Pa.

SHOVEL—Manitowoc Speedshovel, making three one-quarter turn passes per minute during operation, each pass to the fullest hoist and "rack-out" of the shovel.

DAILY PERFORMANCE—5000 cubic yards of rock, shale and dirt each 24 hours.

TOTAL PERFORMANCE—236,000 tons of shot-blasted overburden.

SERVICE LIFE OF HOISTING LINE—15 weeks, compared to usual 8 or 9 weeks—or *66% longer.*

Because it has proved so satisfactory in performance, Allegheny Contracting Company now uses J&L *CenterFit* on a variety of equipment, from bulldozers to drag lines, throughout its widespread mining and excavating operations in Western Pennsylvania.

CenterFit, an exclusive product developed by Jones & Laughlin, is a 17-strand wire rope of advanced design with exceptional performance characteristics. CenterFit with new Bronz-Lube wire rope lubricant, permits 20% faster operating speeds, shows a 25% saving on sheave and drum maintenance, and gives up to ⅓ longer service life! *Yet CenterFit costs no more than ordinary wire rope!*

Your local J&L distributor or J&L warehouse is now stocked with most sizes of this new and better wire rope, that gives longer service at lower cost.

Send for descriptive literature giving complete technical information about CenterFit—and for free Wire Rope Service Record Cards in convenient plastic holder. Address Jones & Laughlin Steel Corporation, Room 411, 311 Ross Street, Pittsburgh, Pa.

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nections. Over each insulated conductor is a spiral wrap of specially treated paper to provide lightweight and durable protection against mechanical injury. Impregnated jute fillers in each valley add longitudinal strength to the cable and serve as "rip cords" for stripping the outer braid of flame- and moisture-resistant cotton, the company says.

Compared with non-metallic sheathed cable manufactured with conventional rubber insulation, RoFlex is lighter in weight with uniformly smaller diameters, resulting in a saving of space in junction and outlet boxes, it is said. RoFlex is manufactured in a popular range of sizes, both two and three conductors, with Underwriters' Approval for 60-deg. C. operation.

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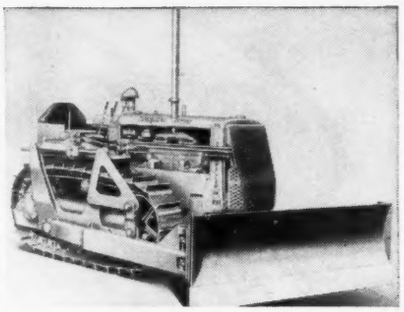
Bulldozers

The Caterpillar No. 4A angling-type hydraulic-controlled bulldozer, designed for exclusive use with the Caterpillar diesel D4 track-type tractor, and two new hydraulic-controlled bulldozers for use with the D2 track-type tractor, have been announced by Caterpillar Tractor Co., Peoria, Ill. With these three new units, the line of bulldozers manufactured for use with Caterpillar diesel track-type tractors has been completed, the company reports.

Supplementing the recently introduced No. 4S straight-type hydraulic-controlled bulldozer, the No. 4A unit (illustrated) is said to incorporate the advantages of the "Caterpillar" hydraulic system and the accepted blade qualities of the manufacturer's hydraulic- and cable-controlled bulldozers. The unit is offered with an 88-in. blade for the 44-in.-gage D4 and 108-in. blade for the 60-in.-gage tractor. The blade has a 31-in. lift above the ground with the blade straight, while with the blade angled but not tilted, the front point will lift 37½ in. with the smaller gage and 38½ in. with the wider gage. The maximum blade-pitch adjustment is 25 deg. and the maximum tilting adjustment is 6 in.



The new No. 2A angling blade and No. 2S straight blade bulldozers for the D2 tractor are said to combine the accepted blade features of the "Caterpillar" bulldozer "family," both cable-controlled and hydraulic-controlled, and the advantages of a highly efficient closed hydraulic system. The No. 2A bulldozer has a blade length of 80 in. for the 40-in.-gage D2 tractor and 97½ in. for the 50-in.-gage tractor. It has a maximum lift, with blade straight, of 28 in., or the front point of the blade will lift 32½ in. for the 40-in.-gage and 34 in. for the 50-in.-gage when the blade is angled but not tilted. It has an 11-in. drop below the ground, a blade angle of 25 deg. and a maximum tilting adjustment of 6 in. The No. 2S bulldozer, offered also for the 40-in.-gage and 50-in. gage D2 tractors, has a blade length of 68 in. and 80 in., respectively. It has a maximum lift of 25 in. and a drop of 10 in. below the ground.

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Pumps

Faster automatic priming resulting from the perfection of a new priming principle is one of four major improvements in its line of lightweight centrifugal self-priming pumps, according to the Gorman-Rupp Co., Mansfield, Ohio. Priming at higher suction lifts, higher pressures and capacities and all-around higher efficiencies, the company states, also results from the application of this new priming principle to its Midget, Hawk and Eagle lightweight pumps, shown left to right in the accompanying illustration.

These new pumps are classified as general-utility units and include:

THE WAY TO BEARING ECONOMY

PROMET
THE Engineered BRONZE

A SPECIFIC FORMULA FOR EACH APPLICATION

AXLE BEARINGS
JOURNAL LINERS
BUSHINGS
WEARING PARTS for

GENERAL ELECTRIC
GOODMAN
WESTINGHOUSE
SULLIVAN
OLDROYD
JOY
and
JEFFREY
EQUIPMENT

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THE AMERICAN CRUCIBLE PRODUCTS CO., 1307 Oberlin Ave., Lorain, Ohio, U. S. A.
Prompt deliveries can usually be made from stocks maintained at

BECKLEY, W. VA., The Universal Supply Co. 1207 S. Kanawha St. . . . . Phone 7307
LORAIN, OHIO, The American Crucible Products Co. Phone 6983
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MT. LEBANON, PA., J. E. Nieser 720 Roselawn Ave. . . . . Phone LE-9876
KERMIT, W. VA., Controller Block & Supply Co., Inc. . . . . Phone 301
WILLIAMSON, W. VA., Williamson Supply Co. . Phone 1200

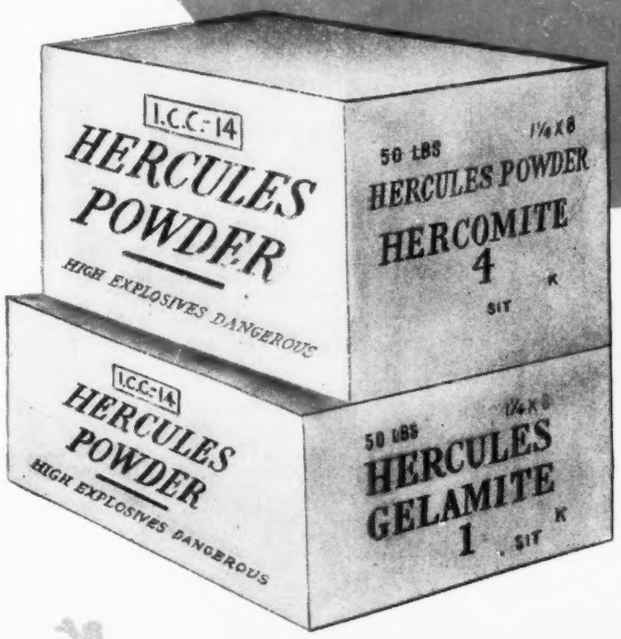
Other Representatives
ALTON, ILL., Frank E. Rhine, 623 Blair Ave. . Phone 3-8624
BIG STONE GAP, VIRGINIA, C. P. Cawood . . . Box 290

FOR STRIPPING . . .

save

10 - 15%

OF EXPLOSIVES COST



In strip mining, metal mining, quarrying, and construction, Hercules Gelamites* and Hercomites† are rapidly replacing older types of explosives. Here are some reasons why:

1. *They save 10% to 15% on explosives costs*
2. *Improved water resistance*
3. *Modern packaging*
4. *Added safety*
5. *Better breakage*

No wonder that Gelamites and Hercomites are by far the most popular Hercules explosives.

HERCULES POWDER COMPANY

INCORPORATED

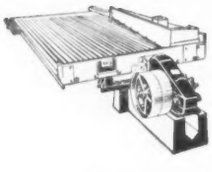
936 King Street, Wilmington 99, Delaware

*TRADE-MARK FOR A GROUP OF HERCULES SEMI-GELATIN EXPLOSIVES
†TRADE-MARK FOR A GROUP OF HERCULES HIGH-COUNT, AMMONIA-TYPE DYNAMITES

XR8-3R

Separation in Full View

. . . a PLAT-O Feature



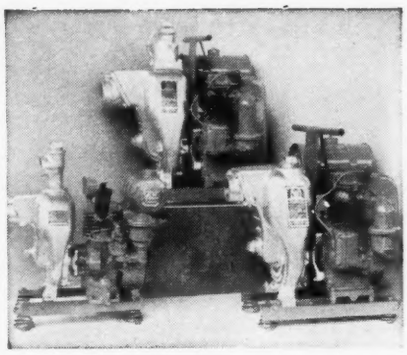
The "separation in full view" feature of PLAT-O Coal Washing Tables permits one attendant to supervise the entire operation of as many as 20 tables . . . each producing 15 or more tons per hour.

This feature becomes practical because PLAT-O Tables function through three general parts . . . deck, underconstruction and headmotion . . . each manufactured to require a minimum of maintenance. The decks are constructed of cypress—"the wood eternal". The underconstruction slipper bearings and tilting mechanism are self-oiling. The patented self-oiling headmotion runs for months without refilling or adjustment.

PLAT-O Coal Washing Tables are available in either right or left hand types. For complete information on applying PLAT-O Tables to your operation, write the Deister Machine Company.

Deister PLAT-O Coal Washing Tables are used in the modern preparation plant of the New Jellico Coal Company, Campbell County, Tenn.

DEISTER MACHINE COMPANY
FORT WAYNE 4, INDIANA



Midget 1½-in. pump, powered by either a Lawson or a Briggs & Stratton 1½-hp. single-cylinder four-cycle air-cooled engine; maximum capacity, 86 g.p.m. with a total head of 30 ft.; maximum lift, 30 ft.; priming time, 1 min. 15 sec. with a 25-ft. suction lift; weight, 62 lb.

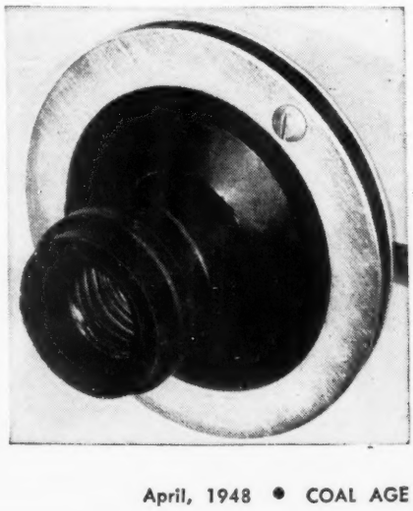
Hawk 2-in. pump; powered by 2.8-hp. Wisconsin Model AB single-cylinder four-cycle air-cooled engine; maximum capacity, 156 g.p.m. with a 30-ft. head; maximum lift, 30 ft.; priming time, 47 sec. with a 25-ft. suction lift; weight, 110 lb.

Eagle 3-in. pump; powered by a Wilson 5-hp. single-cylinder four-cycle air-cooled engine; maximum capacity, 280 g.p.m. with a 30-ft. head; maximum lift, 30 ft.; priming time, 1 min. 19 sec. with a 25-ft. suction lift; weight, 117 lb.

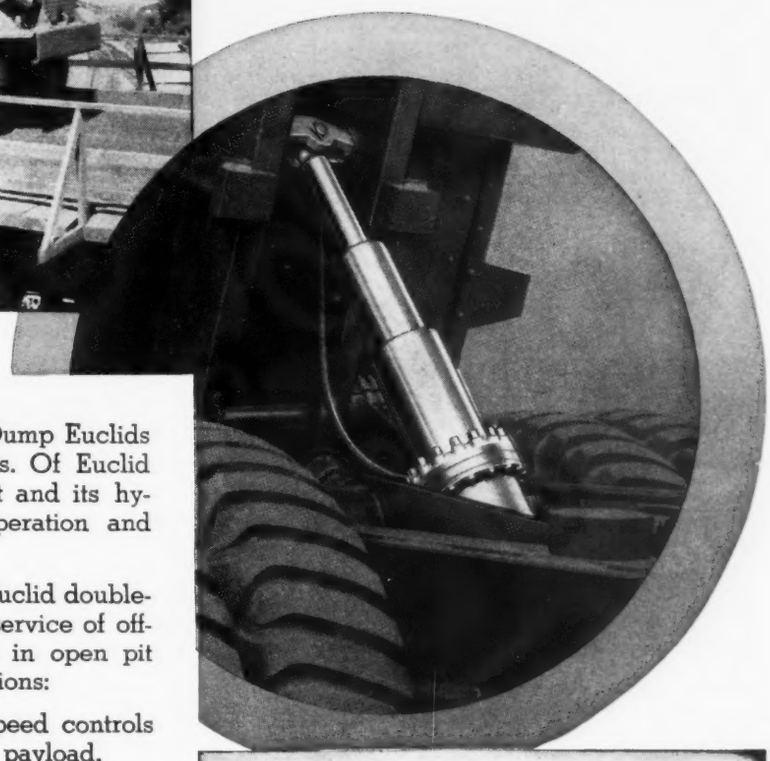
•

Lamp Socket

Mines Equipment Co., St. Louis 10, Mo., has announced a molded (Neoprene) Edison base lamp socket that is said to prolong the life of electric lamps by protecting bulb filaments from surrounding vibration. Molded as a unit to a resilient rubber mounting diaphram that fits a standard 4-in. wall outlet box, all necessary metal parts are protectively encased in Neoprene, and, in addition, a rubber bead on socket's mouth fits bulb's neck snugly. This reportedly seals the "socket-lamp" assembly, protecting its electrical connections against water, dust, oil, etc. In addition to saving in cost of renewed lamps, the new socket will mean less time spent in



EUCLID *fast-acting* HOIST *Speeds Dumping*



THE three-stage hydraulic hoist of Rear-Dump Euclids saves time and reduces hauling costs. Of Euclid design and manufacture, the powerful hoist and its hydraulic system provide fast, dependable operation and ample capacity for the rated payloads.

Here are some of the features that make the Euclid double-acting hoist unequalled for the heavy duty service of off-the-highway work on construction projects, in open pit mines and quarries, and on industrial operations:

Raises Loaded Body Fast . . . Engine speed controls dumping speed; ample hoist capacity for full payload.

Dumps the Load Clean . . . Hoist has 37" stroke which raises body to 70° from horizontal.

Provides Complete Control of Body . . . Conveniently located hoist valve has four positions: raise, lower, float, and hold. All or part of the load can be dumped according to job requirements.

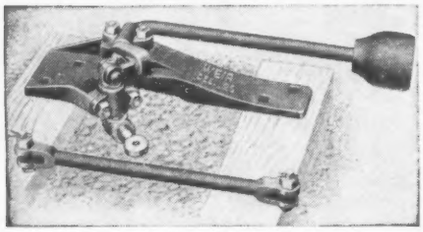
Lowers Body Quickly . . . Hoist is double-acting in third stage . . . lowers the body under power to the point where it settles quickly by gravity.

Ask your Distributor or Representative to show you how all Euclid models, Rear-Dump and Bottom-Dump, are built throughout for efficient, long life in off-the-highway service.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

SWITCH STANDS that CONSISTENTLY *Prove Their Value* in moving MORE COAL...FASTER

WEIR KILBY



Design 25—Parallel Throw

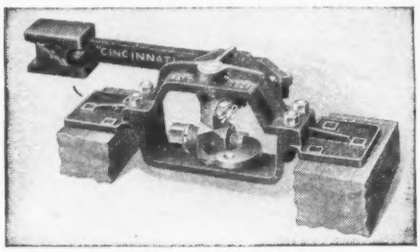
Design 25—An improved Parallel Throw Stand of simple construction and easy operation. The stand is low to give maximum clearance; parts are interchangeable and easily replaced. Adjusting arm permits easy change of throw from 3" to 5".

CHAMPION—Self-locking and non-automatic. The throw is adjustable by means of transferable shims which allow a variation of ⅛" and a range of 1".

Open Type Spring Rod

Enclosed Type Spring Rod

These switch stands furnished with either solid or spring connecting rods.



CHAMPION Parallel Throw

CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

Suppliers to Mines and Railroads Since 1882

WEIR KILBY CORPORATION

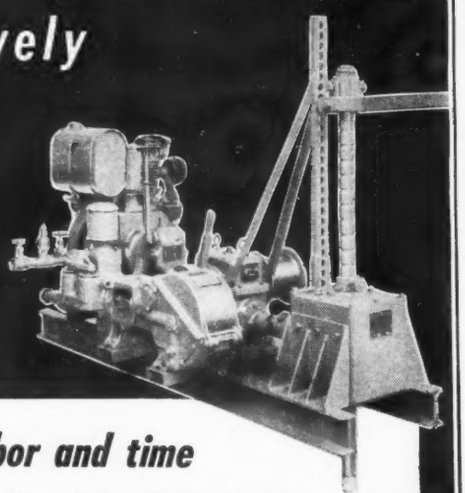
CINCINNATI 12, O. BIRMINGHAM 7, ALA.

for instance* STRIP MINING *in

Know Positively

DEPTH of overburden

THICKNESS *and quality* of COAL SEAM



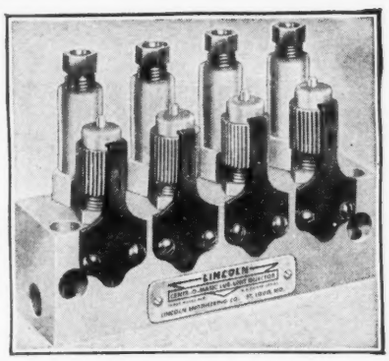
for least cost, labor and time

Light weight, simple operation, Acker Drills furnish complete subsurface information, accurate cores, from 300 ft. maximum depths. No feed screws or feed gears.. Sturdy. Few parts . . . ideal for work in isolated locations. Easy to move over rough terrain; choice of mountings—truck, trailer or drag. Operate diamond, alloy or steel shot bits. Send for fully descriptive circular.

MODEL LD

ACKER DRILL CO., SCRANTON 3, PA.

ACKER ROTARY CORE DRILLS



LUBRICANT INJECTORS—Type SL-3 injectors, manufactured by Lincoln Engineering Co., St. Louis 20, are designed for limited mounting space. They have only two moving parts, are available singly or in manifolds of two, three or four, for mounting either vertically or horizontally. They can be individually set and are adjustable to a maximum lubricant output of 0.004 oz. per cycle.

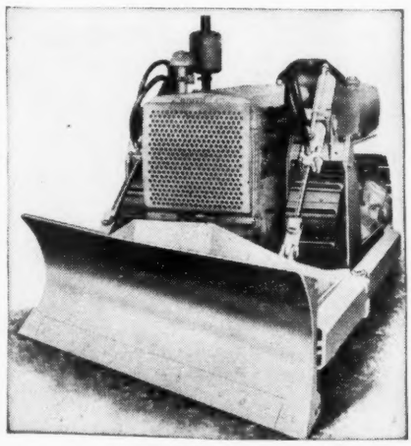
changing burn outs, according to the manufacturer. Socket accommodating up to 150-watt standard "Edison-base" type bulbs is furnished with a 6-in. pigtail lead for wiring.

•

Bulldozer

A newly designed bulldozer said to combine proved methods of hydraulic operation with improved construction features has been introduced by the Wm. Bros. Boiler & Mfg. Co., Minneapolis, Minn. The Bros. "Power-Plus" line of dozers, both straight and angle, now available for D4 and D6 Caterpillar tractors, incorporates the "fluid power control" provided by the LaPlant-Choate hydraulic pump. The hydraulic system of the new line combines pump, valve and oil reservoir into a single unit. The D4 models are said to be the only track-mounted, direct-lift, double-acting hydraulic bulldozers with full-floating trunnion rams. It is the first D4 with positive down pressure. The D6 dozer is frame mounted and, for the first time, incorporates the new compact pump with a minimum of hydraulic piping.

According to the manufacturer, a

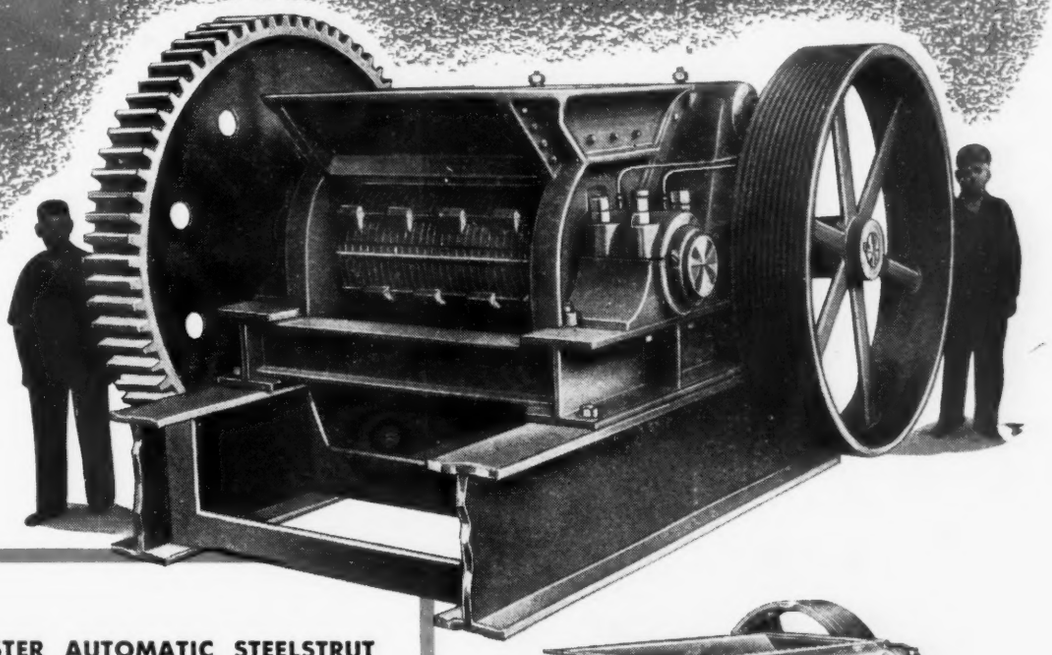


Modernize your production with

McLANAHAN

SINGLE ROLL

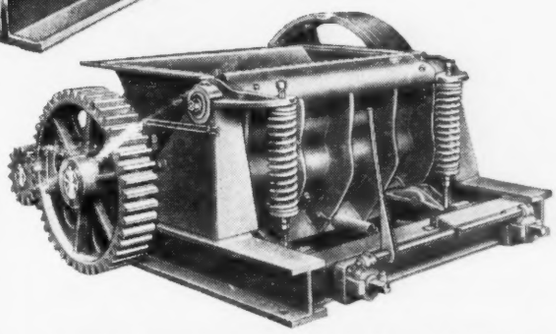
MINE REFUSE AND COAL CRUSHERS!



THE ROCKMASTER AUTOMATIC STEELSTRUT TOGGLE PRIMARY CRUSHER— REMARKABLE POWER AT LOW COST

Note These Real McLanahan Production Features . . .

● All Steel Constructed ● Cast Steel Gears ● Automatic Steelstrut Toggle for Tramp Iron Protection ● Chilled Alloy Iron or Steel, Interchangeable and Reversible Crushing Plate Liners ● Hard Surfaced Steel Segment Rolls Easily Replaced Without Dismantling Machine ● Takes Choke Feed ● Dry, Muddy, Wet or Frozen Material Never Packs ● Lowest Proportion of Flats and Dust Produced ● Slowest Speed of Moving Crushing Elements ● Greatest Crushing Range with Opening Easily Adjustable ● Takes Large Primary Sizes ● Low First Cost—Low Power Cost—Minimum Repair and Upkeep Costs.



FABRICATED BLACK DIAMOND CRUSHER

guarantees highest ton-per-dollar value!

One piece, rigid, well proportioned steel frame, cut steel gears, V-belt drive and industrial type lubrication. Automatic tramp iron protection.

Get the McLANAHAN *FACTS!*

McLANAHAN & STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835

HOLLIDAYSBURG, PENNSYLVANIA

"Power Costs reached a new Low this month, Bill. What's the secret?"

"No secret, Ed—

we've changed to **MESCOWELD RAIL BONDS."**

M8-F
All-Purpose Bond

Mescoweld Rail Bonds check power leaks in a hurry. A patented Flashwelding process for attaching bond to cable assures a more oxygen-free weld and guarantees maximum conductivity and long life. When next you order rail bonds, specify Mescoweld and get the most for your power dollar. **18 types are available for immediate delivery.**

Write for details.

MOSEBACH ELECTRIC & SUPPLY COMPANY
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FLEXIPIPE
The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by more rigid means of face ventilation.

Write for free sample and full information.

BEMIS BRO. BAG CO.
412 Poplar Street, St. Louis 2, Mo.

MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Double knee-action; better trackability. Floating power; less power consumption. Quick acting footbrake—essential for quick stopping, especially behind loading machines. Brake shoes that follow wheels (due to knee-action). Adjustable Timken Bearings throughout.

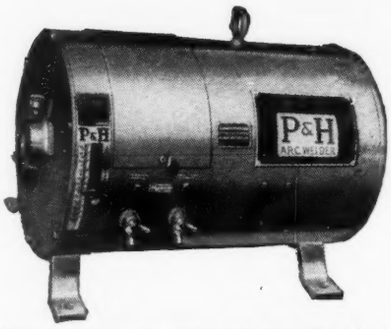
Huskiest transmission in any storage battery locomotive. Oil-tight; leakproof. Use regular auto oil; change every 6 months. Strong. Simple design. Low maintenance cost. Backed by over 25 years of experience with Storage Battery locomotives.

GREENSBURG "MONITOR"

Franklin County Coal Corporation at Royalton and Herrin, Illinois, have 12 of our Monitor type, storage battery locomotives.

All Greensburg Locomotives are CUSTOM-BUILT to your requirements

THE GREENSBURG MACHINE CO. 101 STANTON ST. GREENSBURG, PA.



300-AMP. BARE WELDING GENERATOR, Model WG-300, is said by Harnischfeger Corp., Milwaukee 14, to have a welding service range of 30 to 375 amp. and be designed for easy connection for gasoline engine or power take-off. As with other P&H arc welders, one control provides any desired welding heat within the machine's range.

rigid frame with floating moldboard incorporates these advantages in the Power-Plus line: great strength, offset pivot pin for clearance, easy removal of main frame and blade, reversible cutting edge, correct and proved blade curvature. The moldboard fan-tail design is offset from the push frame and made wider for easier maneuvering and less wear, which is said to give a cleaner bite with less horsepower. The new straddle-mounted cylinder-bracket assembly centers lifting power and equally distributes all working forces. Side twisting is reduced. As a result, more positive control of blade and greater digging force results, according to the company.

Pullers

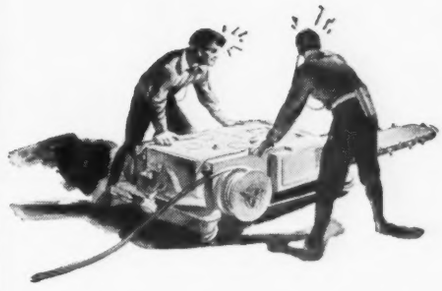
A new, improved model of the CM Puller, announced by the Chisholm-Moore Hoist Corp., Tonawanda, N. Y., is said to be lighter and sturdier than its predecessor and have a more streamlined appearance. The ¾-ton

Famous for Safety and Service . . .

*Securityflex** PARALLEL MINING CABLE

- Cuts Short Circuits
- Meets Pennsylvania Flame Test
- Withstands severe overloads
- Resists abrasion
- Will not kink, twist or tear
- Meets Bureau of Mines diameter specifications

48453



. . . Assures uninterrupted mine operation

*Reg. U. S. Pat. Off.

ANACONDA
from mine to consumer

ANACONDA WIRE AND CABLE COMPANY

25 BROADWAY, NEW YORK 4, N. Y.

Buckeye

The Outstanding 3/4 Yard Shovel

*Now Better Than Ever**

Available for spring shipment

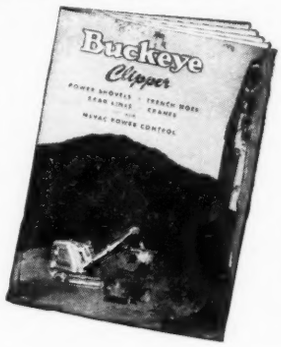
* CHECK THESE NEW FEATURES

- 2-piece swing clutch band-velvet smooth operation; easier replacement.
- Heavier revolving frame; more massive conical roller assembly; hardened steel roller path.
- Positive locking device on crawler adjusting bolt.
- Relay valve in dipper trip vacuum chamber speeds dumping.
- 3-cyl. GM 3-71 diesel engine with hydraulic coupling furnishes greater, smoother, more economical power (optional) and others.

and others

Always a "best buy" because it offers *all* of the construction and operating features that most shovel users want—*plus* Mevac (metered vacuum) power control, the Buckeye Clipper is now better than ever. Buckeye engineers and field men constantly sounding out the hundreds of owners have incorporated feature after feature to make it truly "the users shovel".

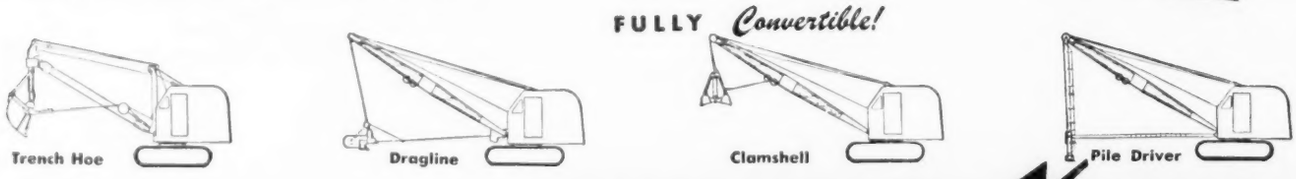
Operators like Mevac control—light touch on small levers actuates vacuum boosters which operate shovel—easy on the operator, easy on the shovel. Faster action, greater yardage. Cuts maintenance costs too. Nothing to freeze, heat-up or leak. Only Buckeye Clippers have Mevac control.



Send for a copy of the new Buckeye Clipper book—pictures Buckeye on all types of excavating, loading and handling jobs—takes the shovel apart before your eyes—explains Mevac control.

See You At the Road Show

FULLY *Convertible!*



GAR WOOD INDUSTRIES, INC.
Findlay Division
FINDLAY, OHIO

Buckeye

GAR WOOD GW INDUSTRIES

THERE'S AN AUTHORIZED BUCKEYE SHOVEL DEALER NEAR YOU

Other Products: Buckeye Ditchers, Spreaders, Finegraders----Gar Wood Scrapers, Dozecasters, Tipdozers ---- Gar Wood Hoists, Bodies, Winches, Cranes, Tanks ---- St. Paul Hoists, Bodies, Truck Patrols

VERTICAL GEARMOTOR, latest addition to Westinghouse Electric Corp.'s line, is a self-contained drive, consisting of a high-speed motor and speed-reducing unit, and offers nine different gear-ratio combinations from 7.61:1 to 38.9:1. The units are available in 3 to 50 hp., 220, 440 or 550 volts, three-phase, a.c.; and 3 to 7½ hp., 115 or 230 volts, d.c. They may be equipped with practically any standard motor in various inclosure types.

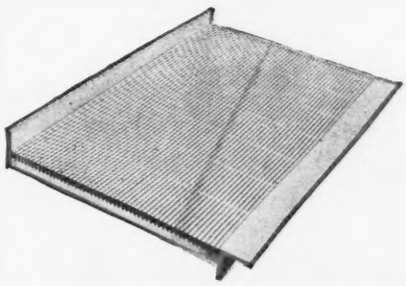
model, for example, weighs only 13 lb. and can be carried with ease. The units, available in ¾-, 1½-, 3- and 6-ton capacities will lift or pull at any angle, the company reports. Design has been simplified so that fewer parts are used and a number of improvements have been made in the lifting mechanism and method of operation, with weight reduction accomplished through the use of aluminum alloy castings for the housing, cover and handle.

•

Speed Changer

Link-Belt Co., Chicago 1, has announced a new Size H-6 P.I.V. Gear variable speed changer and with it, extension of its line of these units through 25 hp. The H-6 unit is rated at 20 hp. for speed variation ratios of 5:1 and 6:1, and 25 hp. for ratios of 2:1, 3:1 and 4:1. The unit is available only in a plain basic Type No. 1 horizontal assembly, with housing split horizontally. Thus, the housing consists of a top and bottom half, instead of the central housing and side-plate construction employed on the smaller P.I.V. Gear sizes.

With the addition of the H-6 unit, the Link-Belt line of P.I.V. Gear variable speed changers now embraces eight sizes. The other seven sizes, ranging from ½- to 15-hp. with ratios up to 6:1 are available in five assembly types, all suitable for horizontal or vertical mounting, including an integrally mounted motor and helical gear-reduction sets. All units are compact, all-metal, fully inclosed and self-lubricating, according to the manufacturer. Folder No. 1874-A, supplementing Gear Book No. 1874 covering



Special uses for

HENDRICK WEDGE-SLOT SCREENS

with Type D Profile Bars

Hendrick Wedge-Slot Screens are made with various types of profile bars to adapt them to specific uses.

Among the applications for Type D Profile Bars, for example, are their use for dewatering at the feed end of shakers, vibrators and chutes, following washbox outflow; with bars counterwise to flow of material to retard surge and promote uniform distribution of material and water.

18-8 stainless steel is ordinarily preferred for these purposes, with small bars 7/64" wide to provide a large open area. A sample assembly will be furnished on request.

SEE OUR CATALOG IN SWEET'S

HENDRICK

Manufacturing Company

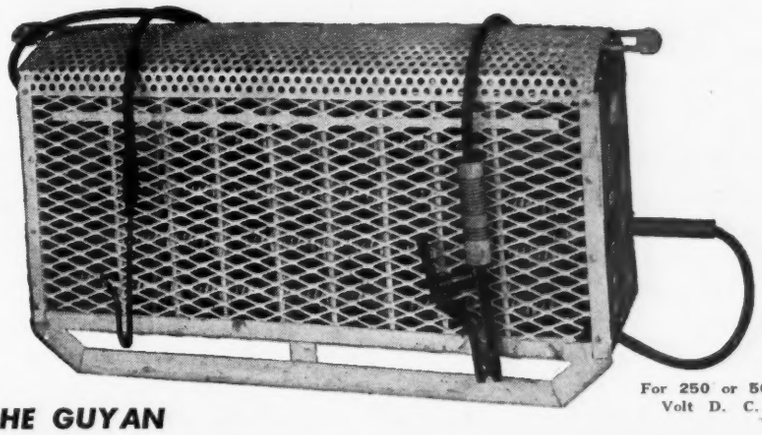
41 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

BRING IT IN
USE IT
MOVE IT OUT

FASTER



For 250 or 500 Volt D. C.

THE GUYAN

PORTABLE ARC WELDER

. . . can be brought to the job hooked up, used and moved out quickly and easily. Handles are located away from coils so there is no waiting for the unit to cool off.

Construction is of a sort that will take the hardest use and all parts are completely protected.
Send for the GUYAN Catalog.

GUYAN MACHINERY CO. LOGAN W. VA.

BANISH YOUR WIRE ROPE PROBLEMS

...With The Laughlin "FIST-GRIP" SAFETY CLIP

Won't Crimp or Crush... rope lasts longer.

Simple, easy to put on... saves time, manpower.

100% Foolproof... can't go on backwards.

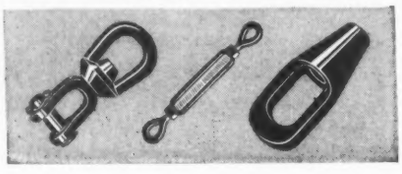
Super Grip... two clips do the work of three U-Bolts.

Extra Strength and Safety... clip and bolts drop-forged.

Distributed through mine, mill and oil supply houses. Write for Catalog 140 . . . up-to-the-minute data on industrial fittings.

THE THOMAS LAUGHLIN COMPANY
Dept. 6, Portland 6, Maine

LAUGHLIN
THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



the new unit and is available from the seven previous models, describes the company.

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Power Driver

The M.S.A. Model B velocity power driver, announced by the Mine Safety Appliances Co., Pittsburgh 8, Pa., is said to speedily anchor pipe hangers, conduit boxes, conveyor brackets and other units to structural plate or concrete. Threaded or headed studs are driven instantaneously through structural plate ¼ to ¾ in. thick and through a maximum of ⅜ in. plate into concrete. Completely self-contained and weighing only 4½ lb., the tool may be operated in any position or location and requires no power supply since it is powered only by the energy of a small blank cartridge, according to the manufacturer. Its operation is said to be comparatively silent, flashless and without recoil, and studs imbedded by the driver withstand tensions of thousands of pounds.

•

Voltage Tester

Ideal Industries, Inc., 1013 Park Ave., Sycamore, Ill., has announced a new voltage tester for testing continuity of circuits (a.c. or d.c.), 110 to 550 volts a.c., 110 to 600 volts d.c., blown fuses, grounded side of line, grounded side of motor or appliance, excessive leakage to ground, frequency (25 to 60 cycles) and d.c. polarity. Indications by both a solenoid indicator and a neon test lamp are said to give double protection since each operates independently of the other. The tester has an easy-to-read scale calibrated from 110 to 600 volts. Over-all length is 6 in., leads are 2 ft. long and weight is 8 oz.

•

Cable Terminals

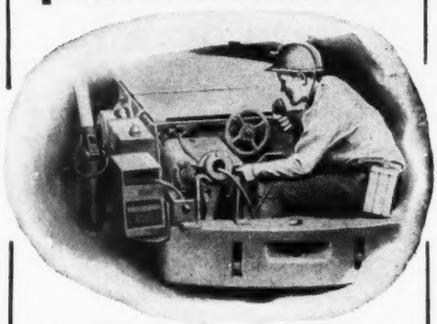
Macwhyte Co., Kenosha, Wis., is now making for "Socketype Cable Terminals," formerly made by Paulsen & Nardon, Inc., Los Angeles, as PN socket-type cable terminals. Consisting of an alloy-steel cadmium-plated eye- or fork-type fitting, plus a stainless-steel sleeve for swaging to cable, the terminals are available loose or attached to the rope in a complete cable assembly to specified length. The terminals are said to save cable and allow the cable to swivel freely when load-free, which eliminates kinking.

Trade Literature
Available Without Charge on Request to the Manufacturer

TRACTOR—International Harvester Co., 180 North Michigan Ave., Chicago 1. Form No. A-34-11 describes in detail the construction, features, application and performance of the new International TD-24 crawler tractor, powered by a 180-hp. diesel engine. Numerous photographs and cutaway drawings illustrate

TROLLEY PHONE

...talk between dispatcher and as many moving or stationary points as needed

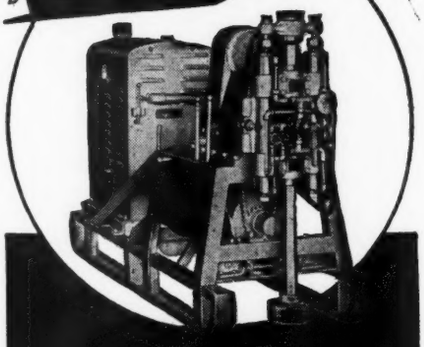


The FEMCO Trolley Phone saves time, saves money, promotes safety. Small compact design of equipment permits installation anywhere. Designed and engineered for heavy duty. All plug-in units for ease of service.

Phone, write or wire for further details.

FARMERS ENGINEERING AND MFG. CO.
549 Brushton Ave. Pittsburgh 21, Pa.

Diamond Core Drilling CONTRACTORS



Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wet mine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

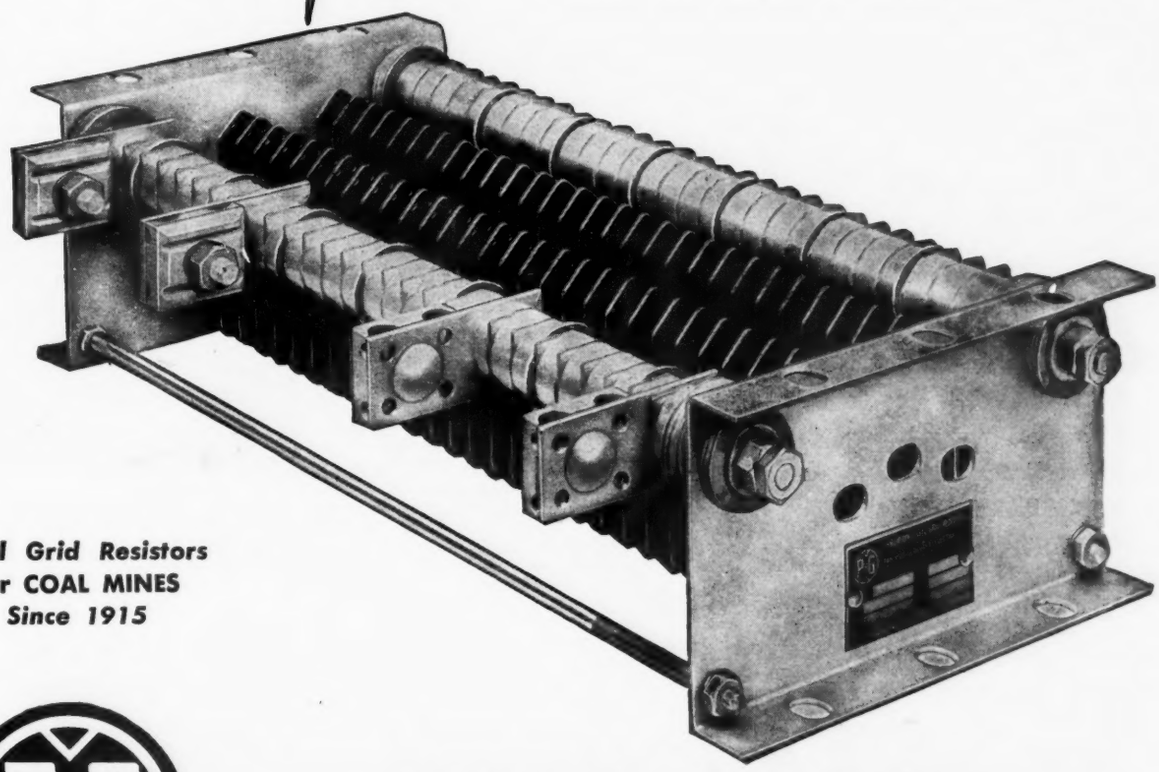
MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

- ☆ All Steel Construction
- ☆ Mica Insulation
- ☆ Rugged Terminals
- ☆ Provision for Expansion
- ☆ Adequate Ventilation
- ☆ Unaffected by Vibration
- ☆ Moisture Resistant
- ☆ Corrosion Protected

Durable

Steel and Mica . . . . . plus unique and exclusive P-G design, result in enduring resistor service. Neither vibration nor moisture laden or corrosive atmospheres have material effect on continuity of service.

Try Post-Glover Steel Grid Resistors for your heavy duty applications where resistors are subject to severe conditions.



Steel Grid Resistors
for COAL MINES
Since 1915

P-G

The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

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HOLDS ITS GRIP!

RUBEROID

INSULATING TAPE

• Tough and waterproof, Ruberoid Insulating Tape holds its grip no matter how it's abused. For over 60 years it's been first choice for wrapping mining machine cables. Here are the reasons:—only Ruberoid Insulating Tape has all these seven important features!

1. Double grip—both sides adhesive
2. Great tensile strength
3. Won't tear, ravel or pucker
4. Resists abrasion
5. Acid and alkali proof
6. Extra thick—one layer insulates
7. Exceeds A.S.T.M. specifications . . .

—by 300% in adhesiveness
—26% in tensile strength
—290% in dielectric strength!

The RUBEROID Co.

QUALITY BUILDING MATERIALS
500 Fifth Ave., New York 18, N. Y.

and explain the advantages and operation of "Planet Power Steering" and other of the unit's features.

POWDER BAGS—American Brattice Cloth Corp., Warsaw, Ind. Folder No. MVP describes "MineVent" powder bags, which are available in various types and capacities and designed to provide a safe and convenient method of carrying explosives. They are made of the same durable material as used in the company's MineVent Tubing.

WIRE ROPE—Wire Rope Institute, Dept. 711, 1044 Shoreham Bldg., Washington 5, D. C. Combination catalog and handbook for "Wire Rope," contains useful information in the selection, buying and using of wire rope, along with data on fittings, attachments, splicing and other related subjects.

PUMPS—Chain Belt Co., Milwaukee 4, Wis. Bulletin No. 47-12 describes and illustrates the complete new line of Rex "Easy Flow" Speed Prime pumps. The various design advancements are described in detail, with detailed specifications, helpful application information and tables.

SCREENS—Robins Conveyors Division, Hewitt-Robins, Inc., Passaic, N. J. Bulletin No. 122-A, describing Style M Vibrex Screen, explains the 2-bearing circle-throw principle employed in this screen, which has adjustable stroke and easy angle adjustment, how the screen, whether floor-mounted or suspended, is always in perfect balance, and includes applications and the full range of sizes in single or double-deck styles.

PUMPS—The Gorman-Rupp Co., Mansfield, Ohio. Bulletin No. 7LW-13 pictures and describes the characteristics, performance and uses of the new Gorman-Rupp Lightweight centrifugal self-priming pumps, which include the Midget 1½ in., the Hawk 2 in. and the Eagle 3 in.

POWER TRANSMISSION — Dept. C - 1, American Flexible Coupling Co., Erie, Pa. Booklet entitled "Relief From Bearing Wear Grief" offers answers to some problems of power transmission loss and prematurely worn bearings through the improper coupling of rotating shafts. It describes the functions of flexible couplings and outlines how the use of proper flexible couplings prevents downtime caused by bearing failure, shaft failure and damaged equipment.

WELDING PRODUCTS — American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill. Bulletin No. 1047-W describes the properties and use of various Amsco welding rods and electrodes and illustrates many equipment parts that have been successfully rebuilt, reclaimed and hard-surfaced for renewed wear, with specific application data on welding material used. A handy alphabetical reference index shows the exact rod to use for various specific applications.

POWER TRANSMISSION — Baldwin-Duckworth Division, Chain Belt Co., Springfield 2, Mass. Bulletin No. 48-6 offers detailed information on Baldwin-Rex Roller Chain Flexible couplings, their design, application, selection and prices. Diagrams of the five types of shaft misalignment are shown and charts facilitate selection and ordering.

MOTOR STARTERS — Electric Machinery Mfg. Co., Minneapolis 13, Minn. Bulletin No. 192 describes and illustrates construction, operation and application of "Hi-Fuse" Combination Starter for high-voltage induction and synchronous motors.

BACKSTOP—The Falk Corp., 3001 West Canal St., Milwaukee 8, Wis. Bulletin No. 10,080 provides complete information on the construction and operating advantages of the Falk Backstop, said to offer a positive method for preventing a reverse rotation on conveyor drives, elevator-head shafts, windlasses, winches and other applications where reverse rotation should not occur.

PRESERVATIVE PAINT—Speco, Inc., 3142 Superior Ave., Cleveland, Ohio. Folder describes Woodtrem, new wood preservative paint reputed to prevent rot and decay and to be especially adapted for wood that is to be buried in the ground or laid on an earth surface. Because of its creosote content, it is poisonous to bacteria and repels insects.

GEARS, REDUCERS—Ohio Gear Co., Dept.

FOR SAFETY'S SAKE, SUPERIOR COUPLINGS

Drop Forged Links

Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS

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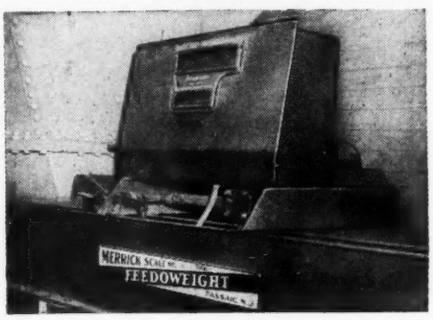
KNIFE & FORGE CO.
1421 Reedsdale St., N.S.
Pittsburgh 12, Pa.



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FEEDOWEIGHT
Reg. U. S. Pat. Off.
tells rate per hour —weight per day

A self-contained automatic conveyor scale, combined with automatic gate to give feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Feed rate may be varied. Large feed opening insures even flow. Uniformly feeds bulk material BY WEIGHT; and automatically totalizes weight of materials fed. Durable. Simple to operate. Rugged, heavy duty design. Slow moving parts means long life. Easy to install and maintain.

Manufacturers of
The Merrick WEIGHTOMETER, which weighs any material carried on a belt conveyor without interrupting conveying operation. Complete descriptive matter on request.

MERRICK SCALE MFG. CO.
Engineers and Mfrs. of Automatic Weighing Equipment
PASSAIC, N. J., U. S. A.

Pangborn Makes Coal Dust Behave

Desire for increased safety and improved working conditions—lower-cost equipment maintenance—efficient coal dust disposal and reclamation—elimination of nuisances—is responsible for the large number of Pangborn dust control installations in coal preparation plants.

For many years a "Pangborn" has been the recognized method of effectively collecting the fine coal dust that is produced in the operation of tipples, dry cleaning, de-dusting and other coal preparation facilities.

With this background of successful experience in the coal industry, Pangborn engineers offer you an effective and economical solution to your dust problems.

Write for free Bulletin 909A, "The Control of Industrial Dust". Address Pangborn, *world's largest manufacturer of dust control and blast cleaning equipment,* at 288 Pangborn Boulevard, Hagerstown, Maryland.

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DUST CONTROL
PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

TURNS DUST LOSSES INTO PROFITS

Give Your Conveyor Belt

NEW LIFE

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BRISTOL'S BELT LACING

★ Quick to Install

★ Joins New Belts Firmly

★ Makes Long-Lasting Repairs

★ For Leather, Rubber, Woven Belts Up to 13/16" Thick

★ Requires Only Hammer and Block of Soft Wood

ORDER FROM YOUR DISTRIBUTOR

THE BRISTOL COMPANY
Mill Supply Division
139 Bristol Road, Waterbury 91, Conn.

86, 1400 East 179th St., Cleveland 10, Ohio. New stock gear and reducer catalog is divided into sections on reducers, gears, chains and sprockets and includes more than 120 pages of engineering data, tests, ratings, ratios, formulae, tables and costs. Essential information on a particular gear or reducer is grouped in a single location.

RECORD SYSTEMS—Systems and Methods Research Dept., Remington Rand, Inc., 315 Fourth Ave., New York 10. Bulletin No. KD367 outlines advantages of modern record-keeping systems in production control, purchasing, supply keeping, management, planning and control.

MAGNETIC ANALYSIS—Dings Magnetic Separator Co., Milwaukee, Wis. Bulletin No. 1120 describes operation of the Dings laboratory, whose service is free, in analyzing materials to determine whether and how they can best be magnetically separated, and in developing new and improved separators.

FINANCING—C.I.T. Corp., 1 Park Ave., New York. Booklet, "Modern Financing Methods," contains various case histories of business operations financed through C.I.T. financing services. Financing of a coal-mine expansion is among those described.

WELDING—Eutectic Welding Alloys Corp., 40 Worth St., New York 13. Railroad Salvage Bulletin "R" outlines simplified welding technique for maintenance and repair of a wide variety of metals, forms, castings, shapes and heavy machinery, and illustrates typical step-by-step operation when welding spring bases, axles, journals, motor blocks, impellers, malleable and cast-iron parts. Condensation of a U. S. and Canadian engineering survey designed to show weldability of various major and minor commercial alloys, as revealed by type of weld, equipment design, and practical application of special gas and arc-welding rods, also is available in the 1948 Eutectic Welder Directory.

SILICONE RUBBER—Dow Corning Corp., Midland, Mich. Booklet, "Silastic Facts No. 5," offers data on all commercially available types of Silastic, the Dow Corning silicone rubber. Several new types of Silastic are included among the six Silastic pastes and the six Silastic molding and extruding stocks for which typical physical properties, including hardness, tensile strength and elongation, are given.

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Industrial Notes

Heyl & Patterson, Inc., Pittsburgh, Pa., has engaged, in a consulting capacity, M. G. Driessen, former chief engineer of the Dutch State Mines, Holland, and inventor of the Cyclone thickener and washer. Mr. Driessen is now a resident of Pittsburgh and will serve as a consulting engineer to the mining industry in general, in addition to his association with Heyl & Patterson.

During the past 18 years as chief of the mining research of the Dutch State Mines, Mr. Driessen made many improvements in heavy-media cleaning of coal. His most publicized invention was the Cyclone thickener, which he reported was capable not only of thickening diluted suspensions but also of cleaning fine coal from ½ in. down to 0, with very high efficiencies even in such small sizes as 100 to 150 mesh. This new process was developed during the occupation and was not discovered by the Germans as the German officer in charge of the laboratory was too lazy to walk up to the third floor where the experiments were being conducted. The discovery was disclosed to the U. S.

WE *Specialize* in SERVICE to the COAL MINING INDUSTRY

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UNDERGROUND PROPERTY DAMAGE INSURANCE

COAL OPERATORS CASUALTY COMPANY
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COAL OPERATORS CASUALTY COMPANY
GREENSBURG, PENNSYLVANIA

Performance Proved...

THE CANTON TRACK CLEANER LOADS

one dirt ton per minute!

A road hog that roots up the hard dirt between rails and loose gob beyond rails, and loads it in cars.

Rigidly built to meet the demands for a heavy duty machine, DIGGER PLATE can be raised or lowered with a hydraulic pump, WINGS are adjusted, up or down, in or out, independent of each other. FRONT CONVEYOR is of floating type, permitting large rock to be handled. BOOM built to accommodate car size. BOOM CONVEYOR can be raised or lowered. MACHINERY protected with a shear pin. Quickly changed. Standard WINGS clean 48 inches from center of track gauge. Extensions to WINGS permit cleaning greater distance. Pulled by a locomotive. Length 21 ft. width to conform to haulway. Weight 4500 lbs.

Capacity—one ton dirt per minute. Does the dirty work without complaint. Send for bulletin.

This machine is now making history in economical coal mining because a machine will now keep floors cleaned and safe, taking the place of track cleaning crews, who have always avoided this type of job.

Performance Record by Coal Company Workmen:

Operating time	100 hr.
Operating 3 men	300 hr.
Cost of labor	$412.00
Distance cleaned	27,860 ft.
Cost per foot cleaned	$ 0.015
Cost per ton loaded	$ 0.465
Tons loaded	887

Comments of Superintendent, six months after delivery of machine: "We have done more cleaning than we could ever have done by hand. 200 men would not have done as much as we have accomplished." (Name on request.)

In writing, please use street and zone number.

THE AMERICAN MINE DOOR CO. **2057 DUEBER AVE., CANTON 6, OHIO**

CLEAN COAL IS AN ASSET

Dustproof your coal with WYANDOTTE CALCIUM CHLORIDE

• Coal that's free from dust and dirt—easy to handle—naturally wins friends among dealers and consumers alike. They'll remember you **in the future** if you dustproof your coal **now** with Wyandotte Calcium Chloride.

• Treatment of coal with Wyandotte Calcium Chloride is safe, economical and easy. A little does a lot to dustproof your coal and give it a sheen that will catch the consumer's eye.

• Investigate today the many advantages of this process. Mail the coupon for full information and literature about Wyandotte Calcium Chloride.

Wyandotte Chemicals Corporation
Michigan Alkali Division
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

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Wyandotte

CALCIUM CHLORIDE

Wyandotte Chemicals Corporation
Michigan Alkali Division
Wyandotte, Michigan

forces after the liberation. Mr. Driessen later was accompanied by a representative of the U. S. Bureau of Mines in an investigation of Germany's latest developments in coal cleaning. In 1946 Mr. Driessen was granted a five months leave of absence from Holland to do consulting work in heavy-medium separation and suspensions, at the invitation of the U. S. Bureau of Mines, in the experimental laboratory at Pittsburgh.

Atlas Powder Co., Wilmington, Del., has named D. J. Carroll Copps Chicago district sales manager for its Explosives Department, succeeding J. H. Buchanan, who has resigned to enter private business. Mr. Copps, who has been assistant manager of the Joplin, Mo., district since 1945, has been with Atlas since 1929.

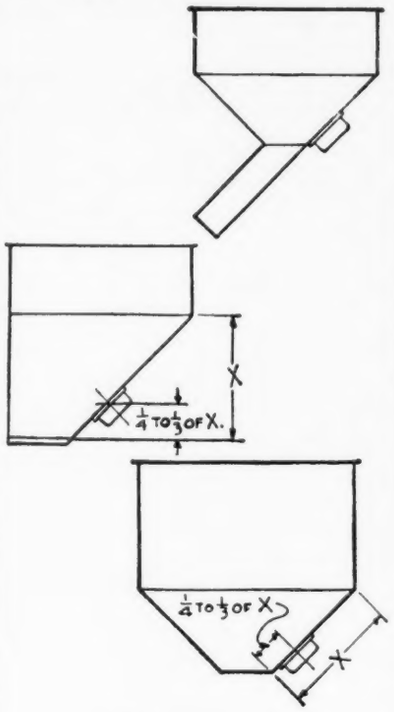
Link-Belt Co., Chicago, has established its own sales office in Louisville, Ky., with headquarters at 136 South Fourth St., to better serve customers in that city and surrounding territory. Emmart LaCrosse Jr., formerly district sales engineer at Indianapolis, has been appointed district sales manager in charge. He will be assisted by Herschel O. Smith, associated with Link-Belt since 1937.

Kennametal Inc., Latrobe, Pa., has named Edwin H. Johnson sales manager of its mining division, to supervise the sales and field development of all Kennametal tools. Mr. Johnson was formerly chief engineer of the Republic Steel Corp. and has been active in pioneering methods and equipment for mechanical coal handling.

The Louis Allis Co., Milwaukee, has announced the creation of three new offices and appointment to them as follows: Louis Allis Jr., vice president in charge of sales; Frank O. Kovich, vice president in charge of manufacturing; and T. R. Wieseman, vice president in charge of engineering. In addition, C. G. Skidmore has been named sales manager; James H. Daganhardt, chief engineer; and John J. Kirkish, chief of electrical design. The new organizational set-up is necessitated by expanding operations and the company also is completing and moving into a large new factory building and office recently erected.

National Mine Service Co. has opened an anthracite division office and warehouse at 153 Welles St., Forty Fort, Pa., under supervision of J. E. Ward. Complete distribution facilities for products of various manufacturers, locomotive and mining-machine parts of Bemeco manufacture and other maintenance items and mine supplies will be provided. Three other divisions of the company are in full operation: Bemeco Division, Beckley, W. Va.; All-State Division, Logan, W. Va.; and Kentucky-Virginia Division, Jenkins, Ky. Gordon MacVean is president and general manager; R. H. Magee, vice president; and E. J. Nicholls, secretary-manager for its Chicago office. Mr. ager of production and research. For

Keep Bins and Hoppers like these



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"Pulsating Magnet"

ELECTRIC VIBRATORS

Eliminate pounding and poking

These heavy-duty Vibrators with variable control of power can be attached to most any type and size of bin, hopper or chute.

Operate from 110 volt, 220 volt or 440 volt A.C.

Can be tied in with bin gate to start and stop automatically—ON when the gate is open—OFF when it's closed.

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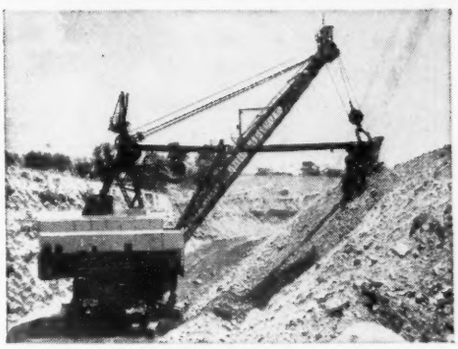
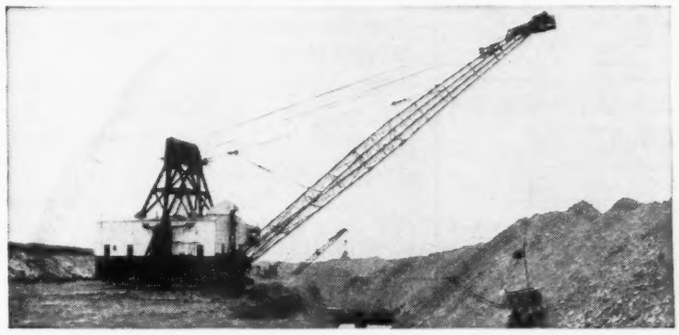
NEW PEAKS IN PERFORMANCE

MARION III·M 3¼-4 YD. SHOVEL



The MARION 40 yd. Electric Shovel is performing miracles on unusually heavy overburden.

If it's big yardage you want and plenty of action, this fast and powerful 111-M is just the machine for you. It is a well balanced machine both in design and construction for maximum stability under load. It has an exceptionally long reach that piles high or heavy overburden profitably. It insures top yardage and low production costs under all digging conditions. It has anti-friction bearings for all high speed shafts . . . air control . . . and ships without major dismantling. Write for all the details about this big-production machine.



Where range and ground conditions are operating factors, MARION Walking Draglines, in sizes from 5 to 30 yds., step right into the picture.

The 6 yd. 151-M is a long range machine built especially for high production in tough digging.

From 3/4 Cu. Yd. POWER SHOVEL COMPANY MARION SINCE 1884 To 40 Cu. Yds.

MARION

POWER SHOVEL COMPANY

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Offices and Warehouses in all Principal Cities • Established 1884

dent; and E. J. Nicholls, secretary. J. D. A. Morrow and A. S. Knoizen, Joy Mfg. Co., are members of the board of directors.

Le Roi Co., Milwaukee, has appointed John E. Heuser assistant sales manager. Mr. Heuser, who for the last three years has handled much of the sales administration for the company, will take over many of the duties of Cecil W. Brown, who recently resigned as general sales manager.

The Fafnir Bearing Co., New Britain, Conn., has elected Maurice Stanley, president of the company for the past 21 years, chairman of the board. Stanley M. Cooper, executive vice president, has been named president.

The Lincoln Electric Co., Cleveland, has named J. S. Roscoe district manager for its Chicago office. Mr. Roscoe, who has been associated with Lincoln since 1924, has been district manager in Pittsburgh since 1944. H. E. Cable, formerly welding engineer in the Pittsburgh area, has been appointed district manager of the Pittsburgh office.

Reliance Electric & Engineering Co., Cleveland, has named C. Richard Newpher, production manager of its Ivanhoe division for the past two years, division manager as well. In his enlarged responsibilities, Mr. Newpher also will have charge of the plant at 1170 Ivanhoe Rd., purchased by Reliance in January from the Detroit Steel Corp.

D-A Lubricant Co., Indianapolis, has named J. H. (Jim) Coover manager of production and research. For the last four years, Mr. Coover has been chief chemist for the company. He will be assisted by Grant M. Rhode, recently of the experimental laboratory, Allison Division, General Motors Corp.

Euclid Road Machinery Co., Cleveland, has appointed Ferguson Supply Alberta Ltd., Calgary, exclusive distributor for the entire Province of Alberta.

The Timken-Detroit Axle Co., Detroit, Mich., has acquired the Stoker Division of the Link-Belt Co., Chicago. Link-Belt has manufactured a full line of stokers, both hopper and bin-fed, for domestic, commercial and industrial uses since 1933. Link-Belt Stoker Division's manufacturing, sales and service organization will continue to function under the supervision of the Timken Silent Automatic Division.

The Timken Roller Bearing Co., Canton, Ohio, has leased 50,000 sq. ft. of manufacturing space at 2300 Linden Ave., Zanesville, Ohio, in which to consolidate all three of its Zanesville operations. The new plant, owned by The Shawnee Pottery Co., will permit installation of all machinery in one building and enable the company to arrange and combine operations to greater advantage, thus saving a considerable amount of floor space.

Pittsburgh Gear Co., Pittsburgh, Pa. has named E. (Eddie) H. Phillips, formerly manager of mine gears and parts division, general sales manager of the company. Mr. Phillips joined the Pittsburgh Gear Co. sales staff in 1941. Francis Knuth has been appointed controller of the Pittsburgh Gear Co.

Transall, Inc., has been established in Birmingham, Ala., to manufacture mine materials-handling and conveyor equipment. Robert C. Hassinger is president and S. J. Spurgeon, vice president.

Eimco Corp., Salt Lake City, Utah, has opened a district branch in Birmingham, Ala., with Wayne Dowdy as manager.

Hendrick Mfg. Co., Carbondale, Pa., has appointed John J. Risko assistant sales manager. Mr. Risko was formerly associated with the S.A.E. Steels Co., Cleveland, and the Columbia Tool Steel Co.

Ansul Chemical Co., Marinette, Wis., has appointed Kenneth B. Covert sales manager of its fire extinguisher division. Mr. Covert was formerly in charge of refrigerant sales at the company's eastern office in Philadelphia.

Marion Power Shovel Co., Marion, Ohio, has appointed John K. Dolan sales representative in its Chicago district office.

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Let them save your time by bringing their broad experience in their specialty to bear on your problems.

It's cheaper to "ride the el"...with

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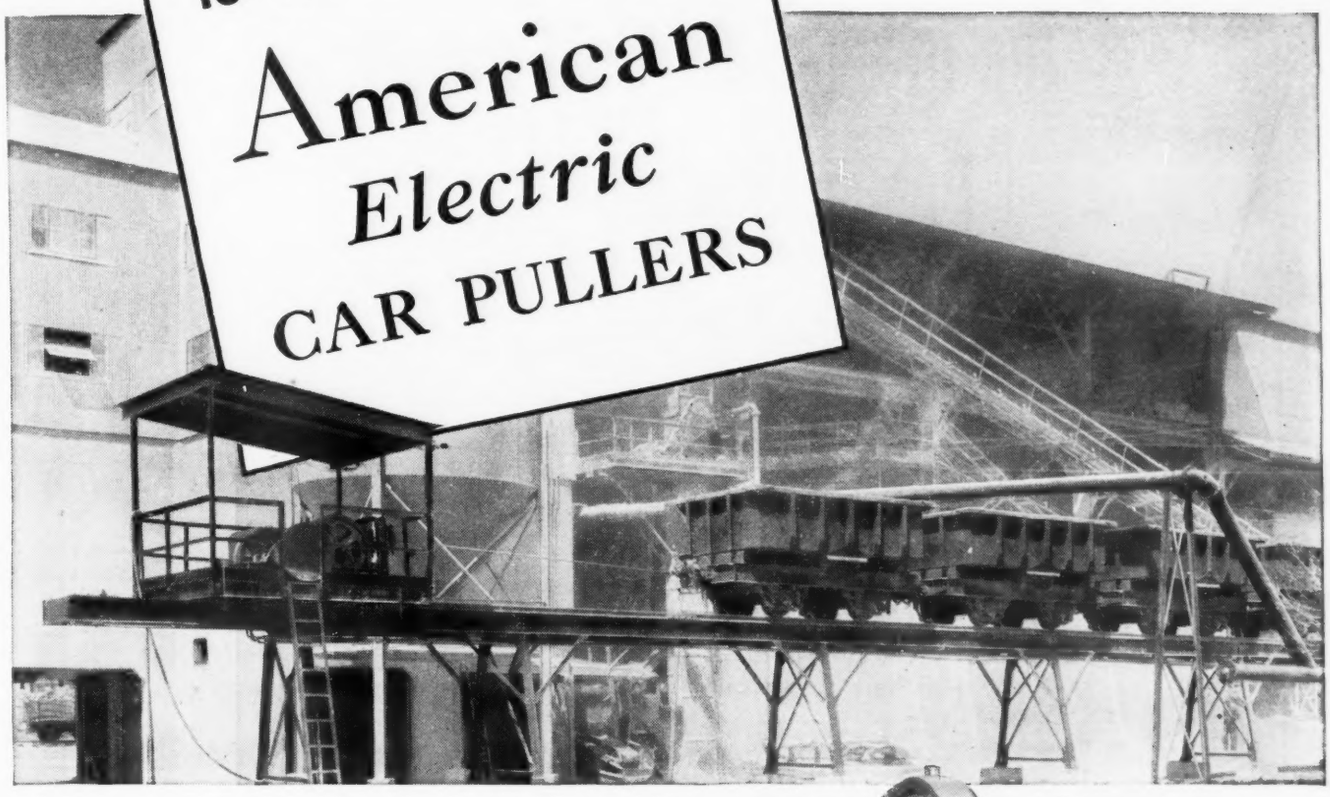
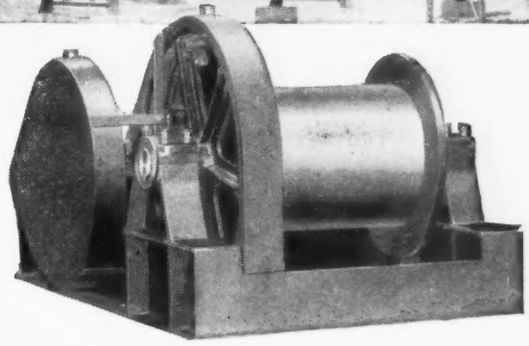


6 SIZES . . . 4,000 LB. TO 30,000 LB. STARTING LINE PULL . . .
HANDLE EVERY NEED IN MINING AND QUARRYING



Take a guess at the average hourly "wages" of a locomotive . . . and then compare that cost with the cost of operating an AMERICAN Car Puller!

The simplest kind of arithmetic will show you that "riding the el", with a short length of elevated track served by a good car puller, is the cheapest and best way of spotting cars for almost any mine or quarry. There's no waiting—no costly expense for standing by—and you have full control of all car movements.

AMERICAN Car Pullers lead the field. They are made by the company that designs and manufactures one of the greatest lines of hoists in the world. The range of AMERICAN Car Puller types and sizes is wide, varied, versatile. Refinements of design and construction—such as machine cut gears, and welded steel beds—assure outstanding ruggedness, dependability, and long trouble-free life.

For complete, helpful information, see your AMERICAN distributor, or write us direct.

American Hoist
and DERRICK COMPANY

St. Paul 1, Minnesota

5103

Plant No. 2: So. KEARNY, N.J. • *Sales Offices:* NEW YORK • PITTSBURGH • CHICAGO • NEW ORLEANS • SAN FRANCISCO

WITH AN EYE TO THE FUTURE

The Bituminous Coal Industry's Public Relations Agency Expands Its Information Services 3 Ways!

1. Women's Club Program

A complete discussion concerning coal, suitable for presentation to Women's Clubs throughout the country, appears in a recent issue of *Agenda,* the magazine that goes to 35,000 club program chairmen. Keynote of this unusual program is an objective picture of the role played by the coal industry in world economy. B.C.I. has tapped a powerful and interested opinion group through the sponsorship of this timely program. Free reprints of this material are offered to club chairmen and their speakers.

2. Entertaining Quiz Booklet

Just off the press, "Old King Coal Calls a New Tune" presents 24 pages of little-known facts about our coal industry. Since primary distribution is aimed at teachers and students, this booklet is offered free in a coupon appearing in scholastic advertisements.

3. Informative Radio Program

B.C.I.-sponsored "Congress Today" is now in its 21st week on Mutual Network Station WOL in Washington, D.C. Presenting Albert Warner's newscast direct from the Press Gallery in Congress, this radio program reaches the important Washington audience five days weekly. Newsworthy commercial announcements about our coal industry are an integral feature of each broadcast.

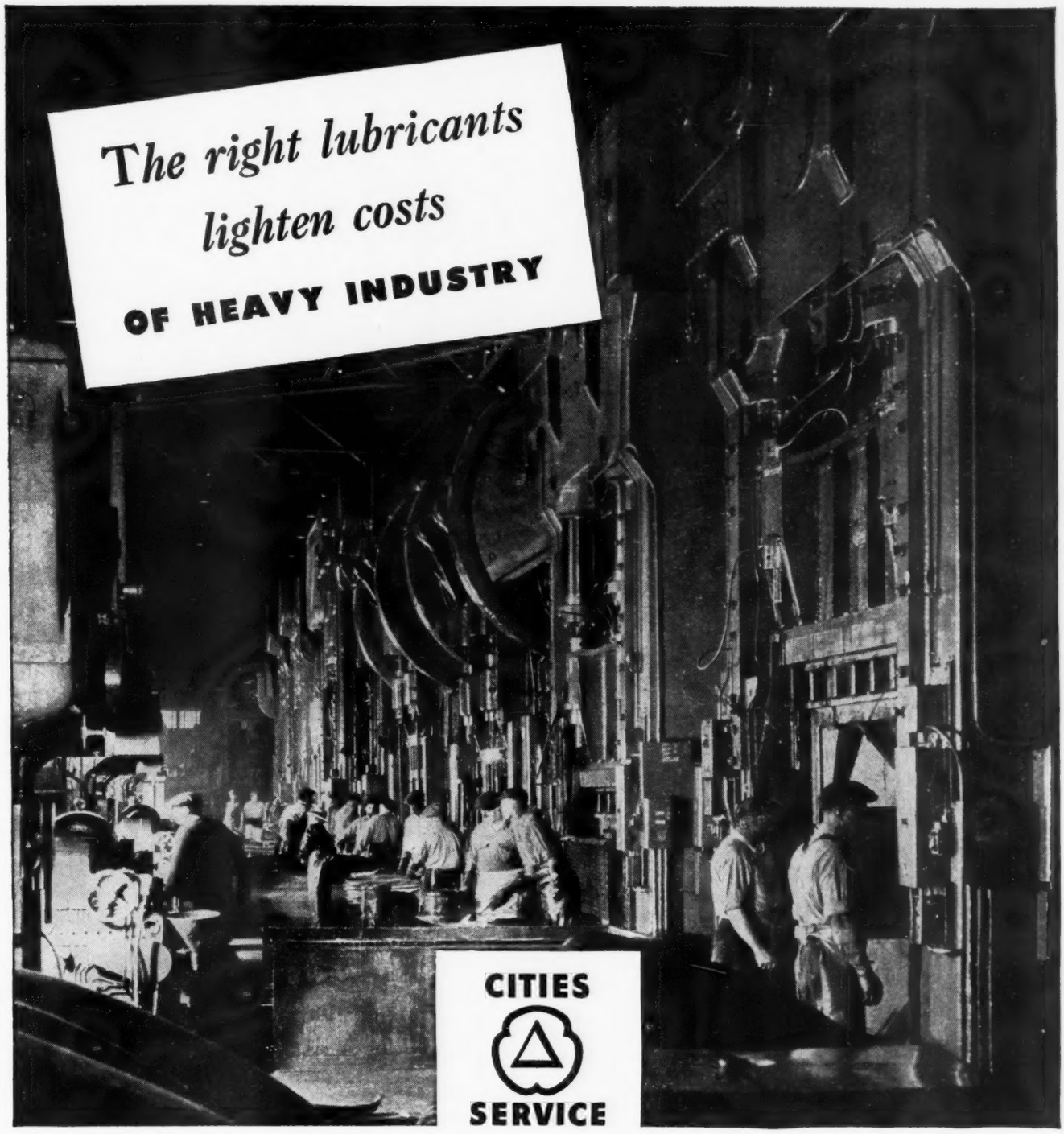
Part of a Long-Range Plan

These new activities are but one phase of B.C.I.'s comprehensive public information program. They strengthen the broad operations carried on through advertising, publicity, motion pictures, the Speakers' Bureau and the Education Department. This extensive public relations program is national in scope—local in effect. It works to the benefit of every segment of this industry.

BITUMINOUS COAL INSTITUTE

A Department of NATIONAL COAL ASSOCIATION
Washington, D. C.

Bituminous Coal . . . Lights the Way . . . Fuels the Fires . . . Powers the Progress of America



INCLUDED in the Cities Service products family of industrial lubricants are oils and greases for more than a thousand industrial applications. Whether your requirements demand a highly refined spindle oil or the heavy duty type greases used on these massive automotive body presses, you'll find it in the right grade and the right type among the industrial lubricants of the Cities Service Oil Company.

Determining the right type and grade of industrial lubricant frequently involves costly experimentation. Why not let a qualified Cities Service industrial lubrication engineer take over your lubrication worries. His recommendations may save invaluable production time and substantially cut operating and maintenance costs in your plant or transportation equipment.

Write Cities Service Oil Company, Sixty Wall Tower, Room 81 New York City 5, N. Y. This puts you under no obligation, of course.

CITIES SERVICE OIL COMPANY

NEW YORK • CHICAGO

In the South: ARKANSAS FUEL OIL COMPANY

HANDLE LARGE CARS *Faster*

—1—
Safer operation . . . coupling and uncoupling without going between cars

—2—
Faster handling of large cars

—3—
Faster shunting and gathering

—4—
Less spillage

—5—
No uncoupling on rotary dumps

WITH WILLISON AUTOMATIC COUPLERS

You'll get more benefits from large cars . . . earn more on your investment . . . when they're equipped with Willison Automatic Couplers. That's because of faster coupling and uncoupling, less time lost in train operation. The larger tonnage handled will more than pay the cost of Willison Couplers. You'll get safer operation, too.

These important advantages, plus the extra values listed at the left, account for the rapidly increasing use of Willison Couplers in the most modern, mechanized mines.

Ask us for details about these strong, durable Willison Automatic Couplers for your present cars or for new ones.

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY
CLEVELAND, OHIO

ESTAB. 1868

WILLISON AUTOMATIC COUPLERS • NACO STEEL WHEELS • NACO STEEL LINKS AND SWIVEL HITCHINGS

BITUMINOUS CASUALTY CORPORATION

ROCK ISLAND ILLINOIS

FINANCIAL STATEMENT

ASSETS — December 31, 1947

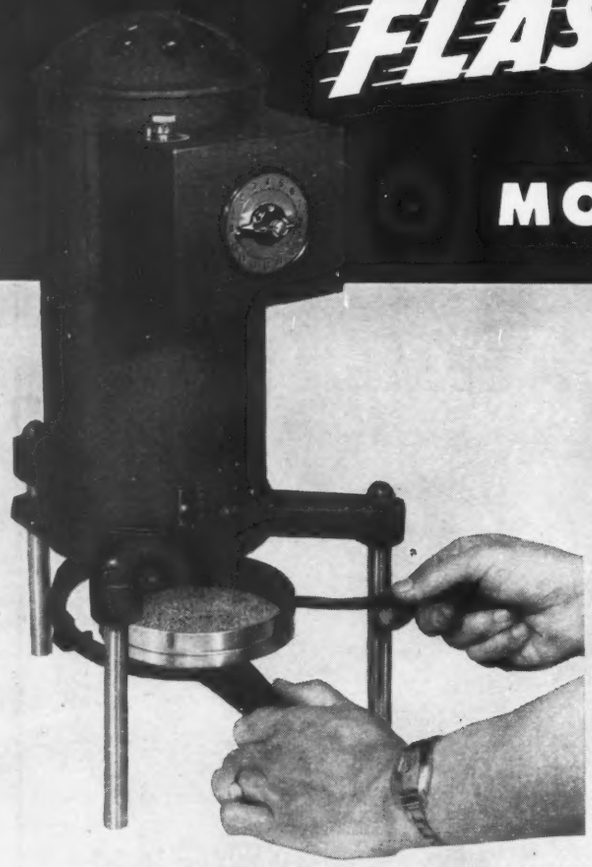
BONDS—(Amortized values):		
United States Government	$14,622,468.67*	
Political Subdivision of States	32,450.89	
Railroads	23,990.73	
TOTAL BONDS		$14,678,910.29**
STOCKS—(Market values):		
Preferred—Railroad, Public Utility, Industrial and Miscellaneous	$ 250,300.00	
Common—Railroad, Public Utility, Industrial and Miscellaneous	676,415.00	
TOTAL STOCKS		926,715.00
Investment in Bituminous Fire and Marine Insurance Company		350,000.00
Cash		2,586,903.00
Premiums in Course of Collection—Less than 90 days due		1,202,869.11
Advance deposit premiums on reinsurance		15,427.49
Reinsurance recoverable on losses paid		14,101.15
Accrued interest on bonds		37,845.85
TOTAL ADMITTED ASSETS		$19,812,771.89

LIABILITIES		
Reserve for Claims		$11,468,858.95
Reserve for Unearned Premiums		4,257,863.63
Reserve for Unpaid Dividends to Policyholders		24,524.42
Reserve for Taxes and Reinsurance		272,040.90
Reserve for Commissions and Other Expenses		321,191.66
Other Liabilities		65,058.41
Provision for Fluctuation in Market Values of Securities		165,000.00
		$16,574,537.97
Capital	$ 1,000,000.00	
Surplus	1,000,000.00	
Voluntary Contingency Reserve	1,238,233.92	
SURPLUS AS REGARDS POLICYHOLDERS		3,238,233.92
TOTAL LIABILITIES, CAPITAL AND SURPLUS		$19,812,771.89

* United States Government Bonds carried at $372,700.13 in the above statement are deposited as required by law.

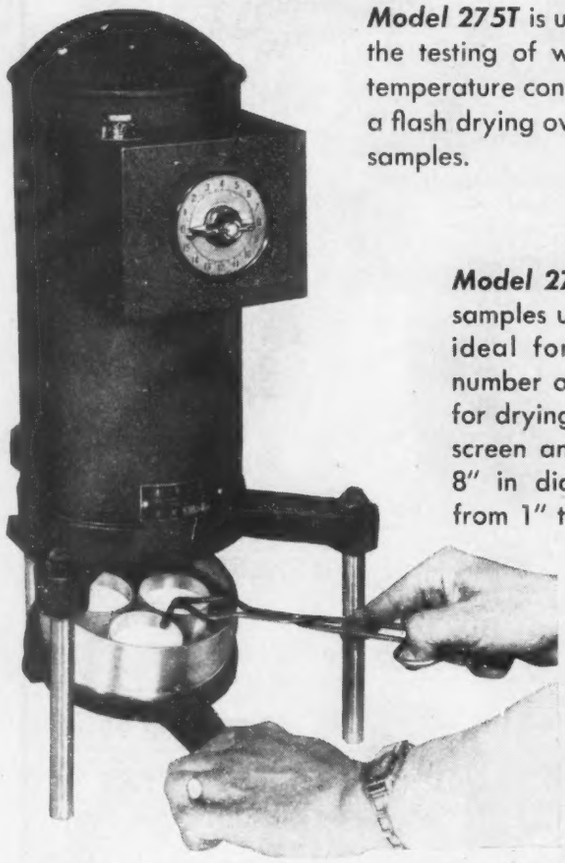
** Market value of bonds $87,920.60 in excess of above amortized value. United States Government Bonds and Cash represent more than 86% of the Total Admitted Assets.

FLASH-DRY SAMPLES TO DETERMINE MOISTURE CONTENT



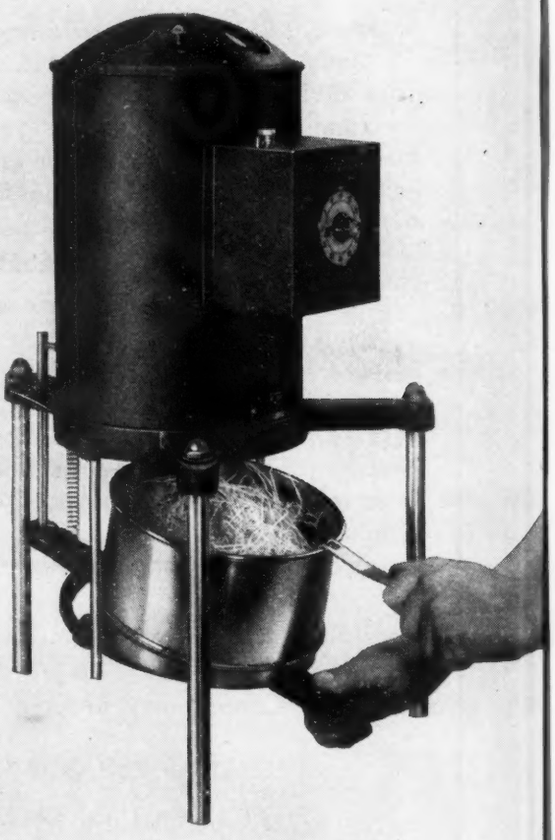
A complete line of Dietert-Detroit Moisture Tellers is available for the rapid, accurate moisture determination of such substances as chemicals, foods, fabrics, grains, sands, fuels, clays, semiliquids and others.

Model 275 is designed for materials not sensitive to drying temperatures. It has a drying pan 5" in diameter holding up to 100 gram samples.



Model 275T is used for all substances, the testing of which requires precise temperature control. It may be used as a flash drying oven for liquids or small samples.

Model 278T is used for bulky samples up to 500 grams. It is ideal for handling a large number of liquid samples and for drying materials in the wet screen analysis. The pans are 8" in diameter and may be from 1" to 4" in depth.



Write for descriptive folder and prices.

HARRY W. DIETERT CO.

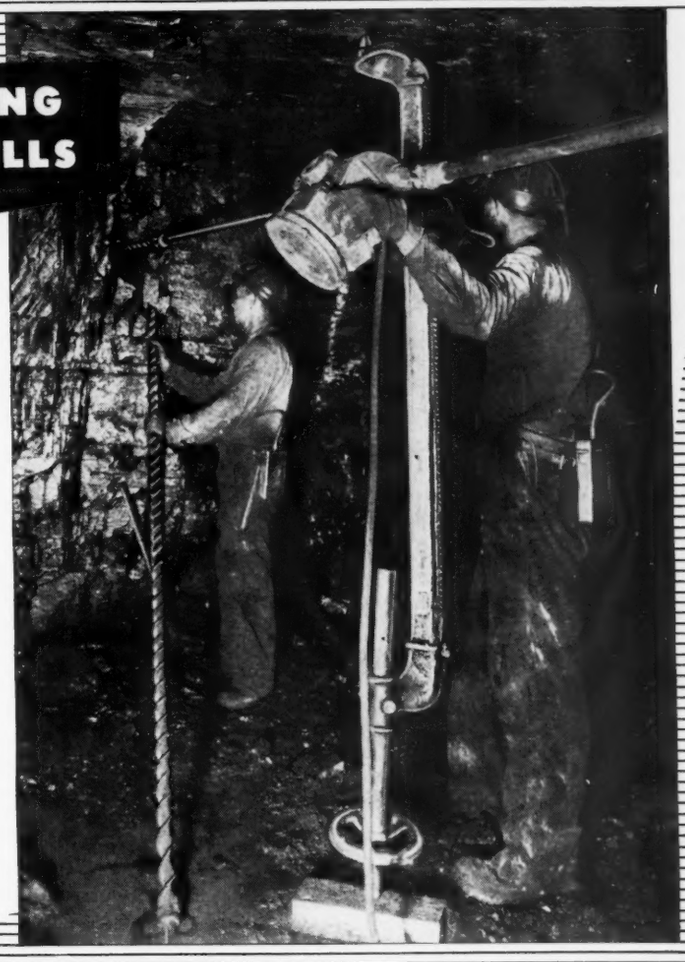
9330 ROSELAWN AVE., DETROIT 4, MICHIGAN

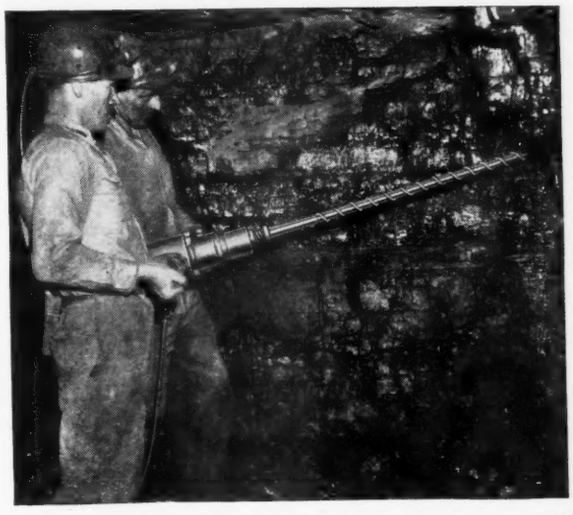
SAND • MOLD • MOISTURE • SULFUR • CARBON

TWO OUTSTANDING PERMISSIBLE DRILLS

from the world's largest line of electric coal drills

Drilling speed
up to 40″ a minute





112 seven-foot holes in 14 hours

The CP No. 574 Permissible Post-Mounted Coal Drill, with a drilling speed up to 40 inches per minute, is easily capable of drilling 40 to 60 holes per shift. The rugged motor, which will stand up under most difficult drilling conditions, complies with all requirements of the U. S. Bureau of Mines, and carries the Bureau's permissible name plate. A drill that is economical to operate and low in maintenance.

CP No. 572 Permissible Hand-Held Coal Drills, with safety clutch, working the difficult Alma seam, drilled 112 holes, 2¼″ diameter by 7 feet deep, each day of two seven-hour shifts. The safety clutch, for release in case the auger sticks, is a valuable protective feature for the operators and motor.

CHICAGO PNEUMATIC TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

LOOK FOR JUNE COAL AGE...

Coal mines of tomorrow"

to bring America's 7635 coal mining operations up-to-date on the newest and best in
EQUIPMENT, OPERATING IMPROVEMENTS
COST CUTTING INSTALLATIONS

Wouldn't it help you and your company if you could visit those mines throughout the nation that lead the industry in efficient production?

COAL AGE editors are doing this *for you* in the June issue, COAL MINES OF TOMORROW. At the time of this announcement the editors assigned to this issue have traveled more than 8,000 miles... visited scores of deep and strip operations, in 9 of the major coal producing states. AND THE JOB IS NOT FINISHED. They will continue these visits up to the last possible moment.

The editors are covering all phases of mining operations to determine not only the best, newest operating techniques... but why they were adopted and, most important, what results are being obtained. They are on the lookout for the newest and best in equipment and cost-cutting installations of all types.

You will find in the advertising, also, equipment "know-how" from leading manufacturers. They are emphasizing illustrations and informative descriptions for each of their products of interest to coal mining men.

COAL MINES OF TOMORROW promises to surpass COAL AGE's previous achievements. It will bring *under one cover* a comprehensive, up-to-date record of technical accomplishments of mines *built for efficiency.*

REMEMBER THE "COAL-FOR-VICTORY" AWARDS & the "MINING EFFICIENCY NUMBER" (May, 1946)?

Two years ago COAL AGE won plaudits from mining men (and manufacturers, too) for the uniquely helpful presentation of the records of the most progressive mines in America . . .

. . . winners of the "Coal-for-Victory" awards sponsored by COAL AGE and the Solid Fuels Administration.

Now, with the close cooperation of scores of coal mine managements, making available their planning and results to COAL AGE editors, COAL MINES OF TOMORROW will take its place along side of that outstanding and well-remembered issue.

Coal Age

A McGRAW-HILL PUBLICATION · 330 West 42nd Street, New York 18, N. Y.

ABC · ABP

Parmanco

MECHANICAL FEED HORIZONTAL DRILL. WITH TRACTION DRIVE

Ten years of field test has proven that our power-feed design of direct, transmission and worm gearing with two-speed control will not only cut shot hole drilling time in half but also eliminates costly maintenance delays. V-belt drive to the power-feed with an additional ample clutch in that assembly gives absolute control of a drilling speed of two to three feet per minute with a retrieving speed of twenty-four feet per minute.

The Parmanco Horizontal is adapted to all forms of high-wall drilling, will handle a six-inch auger up to a distance of sixty feet or more and, by use of our patented augers with interrupted flights and secondary cutters, will drill an absolutely clean hole with a minimum of torque. It permits the drilling of a controlled-angle hole which makes possible a great saving of explosives through the cantilever effect of this controlled-angle drilled hole.

EFFICIENT STRIPPING STARTS WITH EFFICIENT DRILLING

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS

TIME IS THE KEY TO GREATER EFFICIENCY

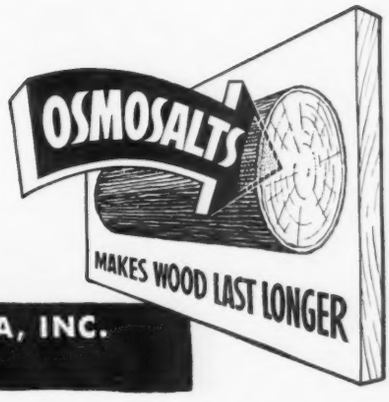
Learn How One Mine Operator

SAVED 23,500 MAN HOURS

IN 1947 BY OSMOSE TREATING HIS MINE TIES AND TIMBERS

There Must be a Reason

WRITE FOR THE FACTS



OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.
GENERAL OFFICE AND PLANT: BUFFALO 12, NEW YORK

overhung loads?

DE LAVAL WORM GEARS WITH SLEEVE BEARINGS

For carrying heavy overhung loads imposed by gears, cranks, pulleys or sprockets, De Laval Worm Gear Speed Reducers can be furnished with generously proportioned sleeve bearings on the output shaft; a choice of either sleeve bearings or anti-friction bearings being available in most models. Both can be depended upon for trouble-free service.

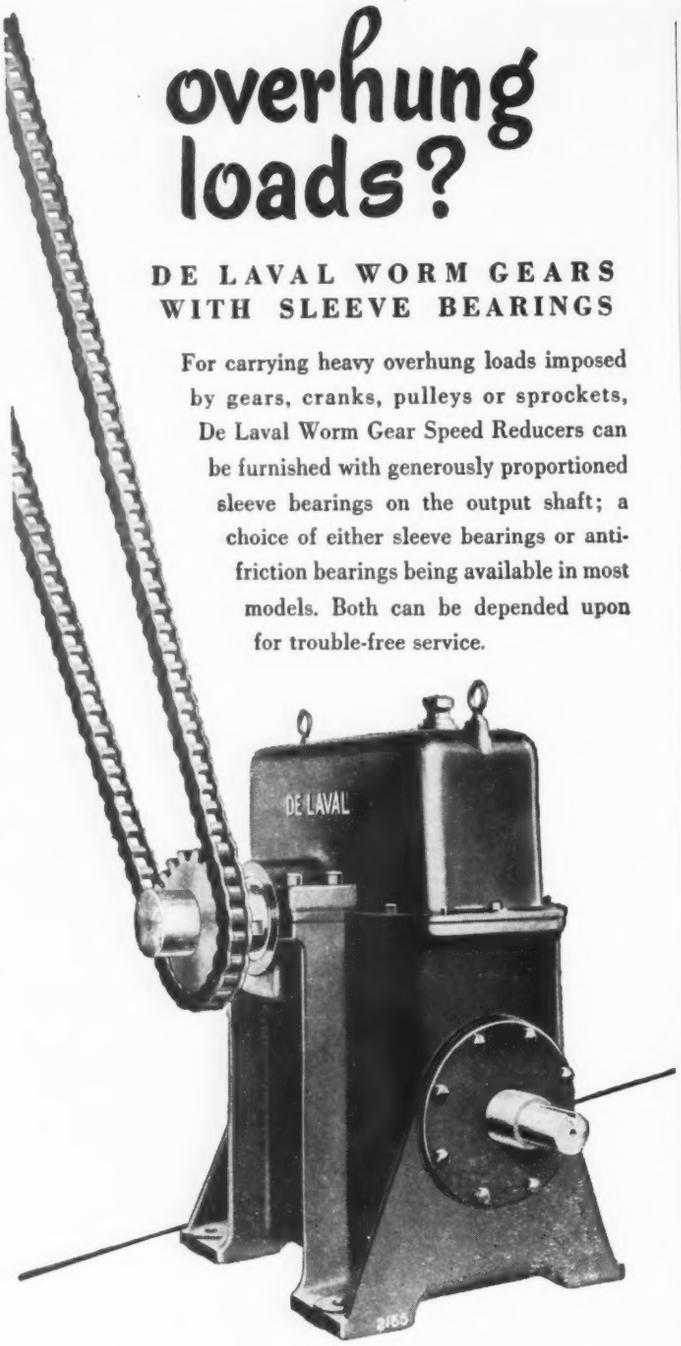


ILLUSTRATION NOTE: Use of an auxiliary chain and sprocket, with the worm gear speed reducer carrying the major reduction, allows ease of subsequent change of overall speed reduction, facilitates interchangeability of speed reducers throughout the plant, and reduces installation costs.

If your speed reducers require an overhung load, consult a De Laval representative.

ONE OF 93. This single reduction De Laval Worm Gear Speed reducer is available with many standard gear ratios and is but one of 93 sizes and types of standard De Laval Worm Gear Speed Reducers.

Worm Gear Division WG-17

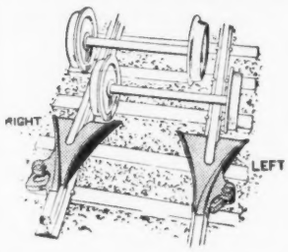
DE LAVAL

De Laval Steam Turbine Co., Trenton 2, N. J.

TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS
CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

World's Quickest Way to Rerail Cars and Locomotives

"Anchor" Rerailers Get 'Em Back on the Tracks, Saving Time, Labor, Money



● This is the quick, efficient way to get derailed cars and locomotives back into productive service. No other rerailer has the patented, scientifically-designed features of the "Anchor" Rerailer.

Smashed hands, strained backs and often fatal accidents are eliminated when "Anchor" Rerailers are used. Safety Inspectors and Engineers highly recommend their use. Made of special high carbon steel for durability and long life.

How Anchor Rerailers Work. "Anchor" rerailers are used in pairs, and will retrack wheels from either or both sides of rail at same time. Each Rerailer straddles the rail, and the narrow end on top of the rail. The derailed wheel comes up the gradual slope, and is forced back on to the rail by the guiding grooves and ridges. Can be used anywhere on the track. The "Anchor" Rerailer is the only one that has a self-contained lock.

Size of Rerailer	*For Use on Rails as Follows:*	*Locomotive or Car Capacity*	*Price Per Pair*
No. 2	16 lbs. to 40 lbs.	10 tons	32.50
No. 3	30 lbs. to 60 lbs.	15 tons	37.50
No. 3½	40 lbs. to 70 lbs.	20 tons	42.50
No. 4	50 lbs. to 75 lbs.	40 tons	52.50
No. 5	70 lbs. to 100 lbs.	100 tons	80.00
No. 6	100 lbs. to 152 lbs.	200 tons	157.50

F. O. B. Bowerston, Ohio

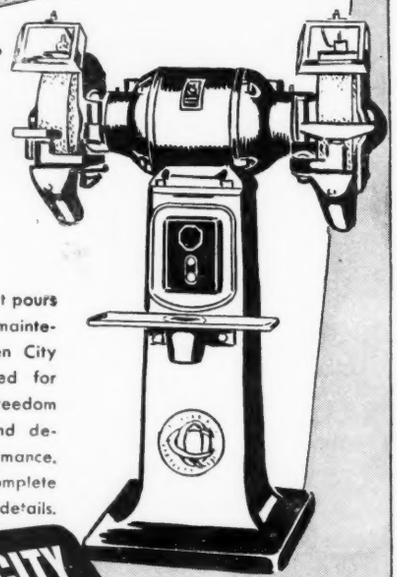
Send Order Now! Immediate Delivery. Complete Satisfaction Guaranteed! Free Descriptive Literature If Desired!

THE NOLAN COMPANY, Dept. CA, Bowerston, Ohio

Formerly The Mining Safety Device Co.

cut tool costs...

with rugged **QUEEN CITY GRINDERS**



It takes a top-quality grinder to stand up under the heavy work that pours through a mine maintenance shop. Queen City Grinders are noted for their durability, freedom from downtime and dependable performance. Send for catalog complete with prices and details.

QUEEN CITY MACHINE TOOL CO.

215 E. 2nd St.
Cincinnati 2, Ohio

AGENTS IN PRINCIPAL CITIES

Sand Drying Stoves

The SUTTON No. O IMPROVED SAND DRYER includes all the time-tested principles that have made SUTTON STANDARD Sand Dryers a favorite for over forty years, plus many improvements to give you even better results. Write for catalogs, prices.

- PERFORATED RING — Entirely new design.
- A FIRE BOWL added between the grate and perforated ring. New type FIRE GRATE.
- ASH PIT DOOR EXTENSION to protect clean sand from ashes.
- 3/16" STEEL PERFORATED SKIRTING with clean-out doors.
- ECONOMY FLAME SPREADER in dome.

SUTTON

Made by **INDIANA FOUNDRY CO.**

950 Oak Street Indiana, Pa.

The Cincinnati

TRADE MARK

ONE-MAN COAL DRILL

. . . lowers drilling costs because it is designed and constructed to give more power "pound for pound" and more drilling efficiency "day after day". Used successfully in drilling both anthracite and bituminous coal. Easy to operate. Sold with money-back guarantee. Write today.

THE CINCINNATI ELECTRICAL TOOL CO.
Division of The R. K. LeBlond Machine Tool Co.
2635 MADISON ROAD - CINCINNATI 8, OHIO

GOYNE PROCESS PUMPS

A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne.

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing only the rear head of the pump. No suction or discharge piping is disturbed.

2. The one packing box of the pump subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.

3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.

4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

All inquiries receive prompt and careful attention.

THE GOYNE STEAM PUMP CO.
ASHLAND, PA.

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your business.*

Maybe "more production" isn't the answer to all our problems

AMERICAN INDUSTRY is already producing at almost double its pre-war rate. Yet with labor and material costs at an all-time high, the experts insist that we must produce still more goods, faster, more efficiently, if we are to avoid another boom-and-bust cycle.

We'll buy that—as far as it goes.

But let's never lose sight of the fact that production is only half the problem. Because for every increase in our rate of production, there must be a comparable rise in our *rate of sales.*

Actually, of course, there is no such thing as producing goods at a profit. Goods are *sold* at a profit—yes. And while production line savings are vitally important, it is of equal importance to keep down the cost of *manufacturing sales.*

That is the function of *mechanized selling*—to produce sales on a mass production basis, and at the lowest possible cost per unit. Translated into more familiar terms, it simply means advertising to the right market, in the right way, at the right time.

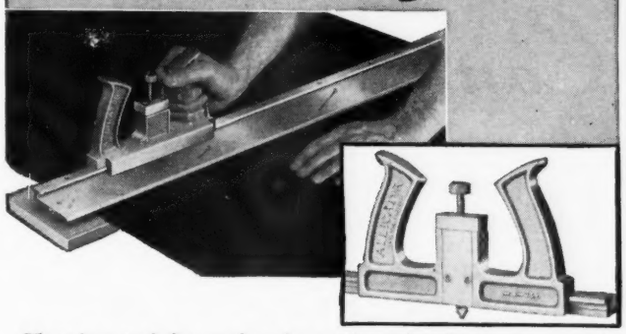
Like the machine on the production line, good advertising is a multiplier of men's efforts, for it enables us to produce (and *earn*) far more than we could alone. And when it goes to work in business papers — with their tremendous concentration of hand-picked readers—advertising becomes the most efficient machine at our disposal for *manufacturing sales at a profit.*

What are the ten ways to measure the results of your business paper advertising? You'll find the answers in a recent ABP folder, which we'll be glad to send you on request. Also, if you'd like reprints of this advertisement (or the entire series) to show to others in your organization, you may have them for the asking.

COAL AGE

is one of the 129 members of The Associated Business Papers, whose chief purpose is to maintain the highest standards of editorial helpfulness—for the benefit of reader and advertiser alike.

MAKES CUTTING OF WIDE BELTS *Easy*



Here is a tool that makes the cutting of wide conveyor and transmission belting a simple and easy job—it's the Alligator Wide Belt Cutter for cutting all belts (except those containing metal) up to 60" wide and 1⅛" thick.

The guide rail is clamped or nailed to the belt and the cutter head is pushed across the belt. Each cut is made about ⅛" deep and with several rapid strokes the belt is cleanly and squarely cut.

Bulletin No. BC-350 gives all the details on this new cutter.

Order from your Supply House

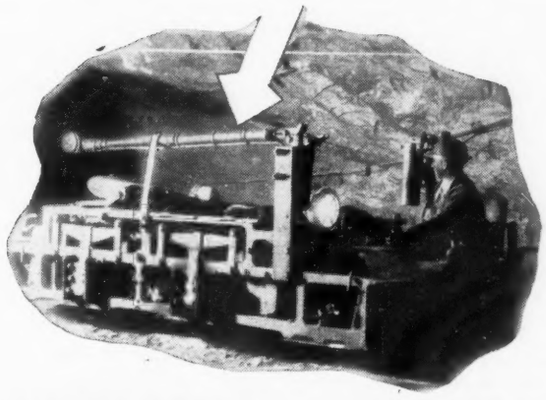
FLEXIBLE STEEL LACING COMPANY

4638 Lexington Street, Chicago 44, Ill.

Also sole manufacturers of Alligator Steel Belt Lacing for transmission and conveyor belts, Alligator V-Belt Fasteners and Flex V Fasteners, for V-Belts, Flexco HD Fasteners and Rip Plates and Hinged Flexco Fasteners for conveyor belts.

TROLLEY POLES

SELECT ASH OR HICKORY



IMMEDIATE DELIVERY

SIZES 4-4½-5-5½-6-7-8-9 ft.
2½" X 1¾"

SPECIAL SIZES ON REQUEST

ORDER EARLY WHILE STOCK IS COMPLETE

Flood City Brass & Electric Co.

Messenger & Elder Sts., Johnstown, Pa.

Branch Office: 4 Virginia St. W., Charleston, W. Va.

MARLOW MINE GATHERING PUMP ON TRICYCLE

Take all you've heard about mine pump efficiency—and add *easy mobility*. That gives you a quick picture of the greatest money-saving mine pump of them all.

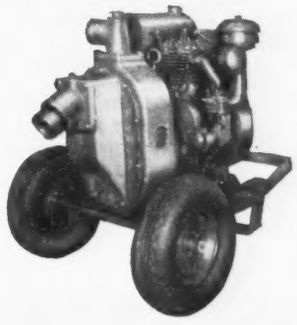
THRIFT CHAMPION

A Marlow self-priming centrifugal pumps more water per horsepower than any other mine gathering pump you can buy, and this low-built tricycle model is quickly moved and positioned in tight locations. It's completely self-priming on suction lifts to 25 feet. Exclusive diffuser priming does away with tricky by-passes and ports. There is nothing to adjust.

EFFICIENCY ASSURED

Pump parts that contact corrosive waters can be made of acid-resistant bronze. And when worn after long hard service, a Marlow pump can be quickly restored to *original efficiency* at very low cost. Both impeller and diffuser are replaceable in a Marlow. That means *continued* low-cost efficiency . . . something you can't get when only "wear plates" are renewable.

Write for Bulletin EM 46 for full details. Marlow Pumps, 548 Greenwood Avenue, Ridgewood, New Jersey.



FOR STRIP MINES

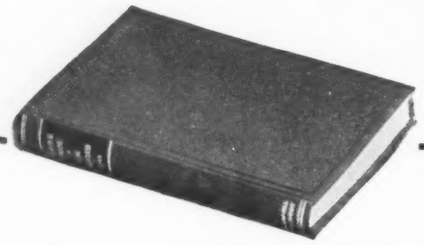
Marlow pumps with the same fully automatic action, wheel or flat base mounted, with gasoline, Diesel or electric power. Sizes 1½-to 10-inch; 50 to 4000 GPM. Request Bulletin G 46.

MARLOW PUMPS

RIDGEWOOD • NEW JERSEY

Manufacturers of Quality Pumps Since 1924

Help yourself to success in your field



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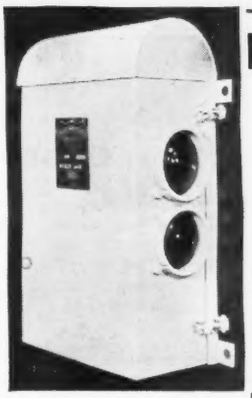

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For Main Haulage • Prevent Collisions
Save Trip Time

A two wire cable connects two or more signals together into one block. Only one signal can show proceed on the entrance of a trip, all other signals show stop.

- Low in Cost.
- Easy to Install.
- Write for Catalog.

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INCORPORATED
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CESCO ELECTRICALLY OPERATED TRACK SWITCH

Thrown by Motorman

Operates Switch Safely • Saves Time and Money

This modern track switch is thrown swiftly and safely by motormen as they sit in their cabs. It saves time and money, and is fool-proof and dependable!

Over 40 years experience manufacturing
ELECTRIC TRACK SWITCHES

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CHEATHAM ELECTRIC SWITCHING DEVICE CO.
INCORPORATED
4780 Crittenden Drive, Louisville, Ky.

"We look into the Earth"

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—anywhere!

PENNSYLVANIA Drilling CO.
DRILLING CONTRACTORS

1205 Chartiers Ave. PITTSBURGH, PA. WAlnut 5816

PERFORATED METAL
COAL MINING SCREENS
Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
CHICAGO PERFORATING CO.
2443 West 24th Place
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Canal 1459

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The Searchlight Section is at your service for bringing business needs or "opportunities" to the attention of men associated in executive, management, sales and responsible technical, engineering and operating capacities with the industry served by this McGraw-Hill publication.

FLORY HOISTS

Manufacturers of Steam, Electric and Gasoline Hoists of all types; also parts for all model Flory Hoists.

FLORY MANUFACTURING COMPANY,
BANGOR, PENNSYLVANIA

COMPLETE BELT CONVEYORS

BELTING • IDLERS • HEAVY DUTY PAN FEEDERS

Immediate Delivery WRITE FOR LITERATURE *Reduced Prices*

FRANK A. KREMSER AND SONS, INC.
3435-45 NORTH 5th STREET, PHILADELPHIA 40, PENNA.
At Fifth Street Where The World Goes By On The Pennsylvania Railroad • REgent 9-7272 " 9-7524

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EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RELEASED

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POSITIONS WANTED (full or part-time individual salaried employment only), ½ the above rates.
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BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.
DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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The advertising rate is $7.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches —to a page. C.A.

NEW ADVERTISEMENTS received by 10 A.M. April 26th will appear in the May issue subject to limitations of space available

PREPARATION ENGINEER

Engineering graduate, 28-35, with at least three years' experience in preparation plant operation and maintenance to understudy chief preparation engineer for progressive coal company in Southern West Virginia. Salary $4800 to $7200. Housing available. Send complete details of experience and training in reply. P-4462 COAL AGE 330 West 42nd Street, New York 18, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

MINE TRANSITMAN—G. I. Job—trainee or experienced; give full information and salary wanted to Box 125, Pineville, Ky.

WANTED: GRADUATE Mechanical Engineers experienced in the design of coal mining machinery, particularly loaders and undercutters, to work for well established heavy machinery manufacturer as project engineer in direct charge of development and design of new machine. Please write giving qualifications and for further details to P-3778, Coal Age.

COAL STRIPPING Superintendent wanted immediately. Coal Stripping firm requires capable Superintendent for Ohio operation. Required references, age and experience. Salary $4800-$6500. P-4453 Coal Age.

SELLING OPPORTUNITY OFFERED

WANTED: Man with experience in sale of heavy mine equipment. Give age, experience, with whom employed. Must have testimonial for ability and character. RW 4306 Coal Age.

POSITIONS WANTED

PURCHASING AGENT or Supervisor of mine supplies for large mechanized mine qualified. References furnished upon request. PW-3847, Coal Age.

PRACTICAL COAL Mining Engineer, 30 years experience Anthracite and Bituminous, Certified Pa., Ky., and W. Va. Available as Consultant to Mining companies wishing increased tonnage and decreased cost. PW 4302, Coal Age.

SPECIAL SERVICE

COAL MINING executive under 50, semi-retired, with small office on Long Island from which he directs overall production, sales royalties, etc. of mining properties; visiting these properties as it becomes necessary. Would consider taking on other properties on the same basis or special investigations. Thirty years in mining and mining finance, good references. SS-4462, Coal Age.

BUSINESS OPPORTUNITY

WANTED TO BUY or lease coal lands in Ohio, West Virginia, and Pennsylvania. BO- 4282, Coal Age.

MANUFACTURER'S AGENT

Covering mines in the Pittsburgh District desires one or two additional electrical or mechanical engineering specialties. Best of references furnished.

RA4482 Coal Age
330 West 42nd Street, New York 18, N. Y.

COAL LANDS

Suitable for strip mining. Complete details upon request.

G. B. LORRAINE
Law Building Richmond 19, Va.

INVEST IN COAL LANDS

For Sale, 20,000 acres of virgin Pittsburgh No. 8 coal, near Penna. and B. & O. RR., suitable for underground mining. Also several thousand acres of stripping coal. Eastern Ohio.

For further information write to
Frank Signorelli, Realtor
Weirton, W. Va.

WANTED

Geologist-Engineer
(Graduate or Practical)

LANDMAN

To help find and develop
COAL Properties

If you have reason to believe that you can help us locate some good coal properties ANYWHERE (preferably for strip mining) we can offer you a most attractive proposition. Either part or full time. Write—

MORGAN MINES, INC.
19 W. 38th St., Indiantpolis 8, Ind.

WANTED

¾ to 5 yard Shovels
2 to 10 yard Draglines
Tractors and Dozers

Frank Swabb Equipment Co., Inc.
Hazleton National Bank Building
Hazleton, Pa.
Telephones 4911 and 4910J

WANTED TO BUY

BATTERY LOCOMOTIVE

24 inch gauge, 2½ to 6 ton capacity, with or without batteries and charger. Must be in first class condition. All details and lowest price in first letter.

LITTLE CHIEF COAL CO.
807 W. Walnut St., Shamokin, Pa.

5000 ACRES

of coal lands

in the Kentucky and West Virginia coal field for sale or lease. Lands near Kermit and Naugatuck W. Va. Several workable seams on the property.

Complete details upon request.

P. O. Box 106 Inez, Ky.

FOR LEASE: 337 ACRES
LEVEL LAND, PARTLY DRILLED
OHIO STRIP COAL LAND
Jackson & Milton Townships, Mahoning County
Thirteen to forty foot overburden. No hard rock. 3½ to 4 foot good coal. On hard surface roads. Close to Railroad and within 14 miles of Youngstown, Niles and Warren. Give financial and other qualifications with inquiry.
Owner: Donald Kirk, Axis, Alabama

FOR SALE

Manion Diesel Power Shovel No. 331, Serial No. 7180. Crawler mounted, 22-foot boom, 18-foot stick, chain crowd, ¾ yd. bucket, in splendid working condition, immediate delivery.

Major Equipment Company, Cambridge, Ohio

When You Want
NEW OR REBUILT
• MOTORS
• CONTROL TRANSFORMERS, etc.
Contact
PENN ELECTRICAL ENGINEERING CO.
SCRANTON, PA. Established 1908

FOR SALE

Fifty (50) New Car Wheels, 2-7/32" bore to fit 2½" axle, 14" O.D., 4½" face, including the flange, 6½" through hub with oil reservoir.

WHITERROCK QUARRIES
'Phone Bellefonte 795
Bellefonte Penna.

—TRANSFORMERS—

TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign All Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
Station M Since 1912 CINCINNATI 27, OHIO

DO YOU NEED COPPER WIRE?

We have in stock:

300,000 — 500,000 — 1,000,000 CM Stranded Cable—also 4/0 Grooved Trolley and 4/0 Solid Round.

Pneumatic Tired Trailers—4 Wheel, Roller Bearing, 21" High—Can be used as Pit Cars, Supply Cars, etc.—Trackless Mines.

Handy Hoists—Compact All Steel—3 Ton Capacity.

Steel Beams and Angles—10 inch, 35 lbs. to ft., 2½" x 3" and 6" x 6" Angles.

Two New 3-Drum Hoists, 100 H.P.

PRICES YOU CAN AFFORD TO PAY — QUALITY YOU CAN'T AFFORD TO MISS!

MANSBACH METAL COMPANY

Logan, W. Va. **Phone 1071**

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By Order of the

U. S. DISTRICT COURT

for the

SOUTHERN DISTRICT

of Illinois

SOUTHERN DIVISION

We Will on

Tuesday, April 27, 1948

Commencing at

11:00 A.M. (CST)

AT

CARLINVILLE, ILL.

Macoupin County

Sell at

Public Auction

The Entire Assets of

STANDARD COAL MINING & CONVERTERS CORPORATION

BANKRUPT NO. 11629

Property Appraised by

Allen & Garcia Co.

At Over

$2,500,000.00

HON. BASIL H. COUTRAKON
REFEREE IN BANKRUPTCY

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HARRY J. MYERSON

and

LESLIE G. PEFFERLE
ATTORNEYS FOR TRUSTEE

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Descriptive Circulars may be Obtained from the Undersigned Auctioneers

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MICHAEL TAUBER & CO.

AUCTIONEERS

411 S. MARKET STREET

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TELEPHONE: WEBSTER 4500

FOR SALE

Available for immediate shipment. Practically new.

2—30"x26" Rectangular Suspended Separation Magnets, 125 volts DC. Watts each 1460 with enclosed DP contactors and PB station.

1—Motor Generator 440 volts, 3 phase, 60 cycles; 125 volts DC. Open. Field rheostat. Magnetic starter.

1—Enclosed safety type DPST knife switch 60 amps. 250 volts.

CHARLES J. MUNDO
Union Trust Building **Pittsburgh 19, Penn.**

AVAILABLE MARCH 1st

1,000 to 1,300 tons No. 1 Relaying Rail, 25 lbs. to 45 lbs. per yard.

For Details Contact

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COMMERCIAL METALS COMPANY

POST OFFICE BOX 1046

DALLAS, TEXAS

FOR SALE:

MOTORS

2 Reliance 20 H. P. DC 250 Volt Motors, with switch and remote control, speed 1700, enclosed motors.

BLUEBIRD COAL CO.

HARRISBURG, ILLINOIS

FOR SALE

220 and 250 volt D.C. Motors 1 H.P. to 40 H.P. Starters, transformers, controllers.
1 Goodman Type 5 DISC hitch cutter.
1 Type TX Westinghouse DC industrial analyzer.
5 Fay-Bowen room fans.
1—Jeffrey MM 47A sectional room conveyor.
1—1-ton Shepherd 250V DC electric hoist.
1—12x12 Dean Holyoke vertical triplex pump, brass fitted, herringbone glass, 100 H.P., DC motor.
6—6x12 American horizontal geared pumps. Duraloy metal water ends.
1—50 KW Kerr turbine generator 230/250 volts DC.
1—25 H.P. 230V DC motor-generator set.
600 ft. No. 14 12 in. vent tubing and couplings, new.

ROBT. GAGE COAL CO.
South Euclid Ave.,
Bay City, Mich.

BUILDINGS

20 ft. to 160 ft. Clear span.
40 ft. to 600 ft. length.
Also Light Utility Buildings.

A. JAY HOFMANN COMPANY
Narberth, Pa.

FOR SALE

One Jeffrey L-400 loading machine and one Jeffrey 29C arcwall cutting machine A-1 condition. For inspection arrangements write or call

CANEY ELKHORN COAL COMPANY
Prestonsburg, Kentucky, Telephone 3251

FOR SALE

1 - 6 DH 1611 Buda Diesel motor, electric starting, complete or in part.

3 - 60 cycle, single phase, 15 KVA, 2300 volt input to 220-240 volt output, transformers.

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Call or write Mid Atlantic Coal Co., Somerset, Pa. Phone Somerset 998-J-2.

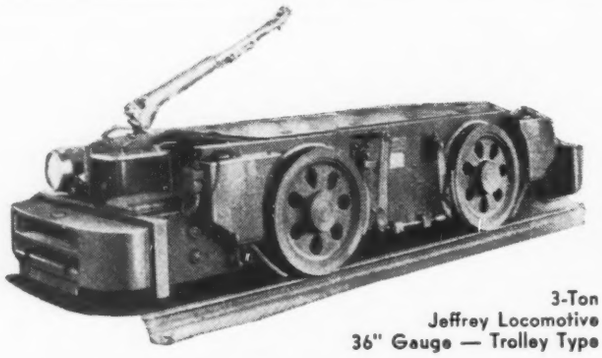
LOADING BUCKET

1 Daniels-Murtaugh, 2 cu. yd. coal loading bucket, with one extra door. Bucket is practically new, and has been used very little. Will fit Lorain 75 or 77. Price, **$1500.00**. Can be seen at Hazard, Kentucky. B. Perini & Sons, Inc.

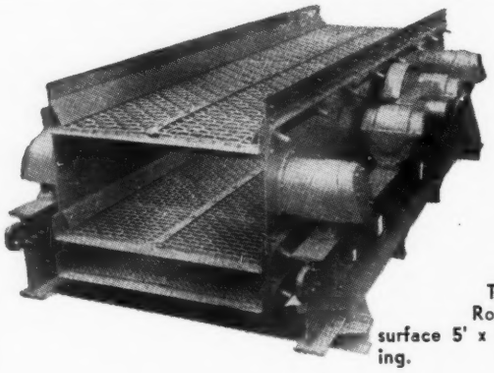
COMPLETE LIQUIDATION

IMMEDIATE DELIVERY

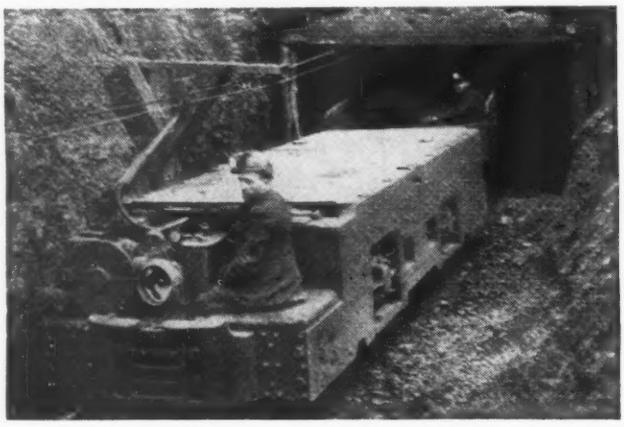
... Three and one-half million dollars in new and nearly new coal mining machinery and equipment



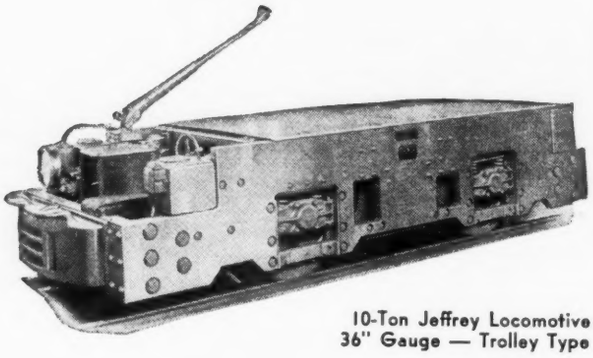
3-Ton
Jeffrey Locomotive
36" Gauge — Trolley Type



Type F-600 Ty-Rock Screen 2—surface 5' x 10' Full Floating.



6-Ton Jeffrey Locomotive 36" Gauge — Trolley Type



10-Ton Jeffrey Locomotive
36" Gauge — Trolley Type

20-Ton Goodman Locomotive High Type — 36" Gauge

8-Ton General Electric
Locomotive — 36" Gauge

THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY **DENVER 2, COLORADO**

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

SEE PAGE 213 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

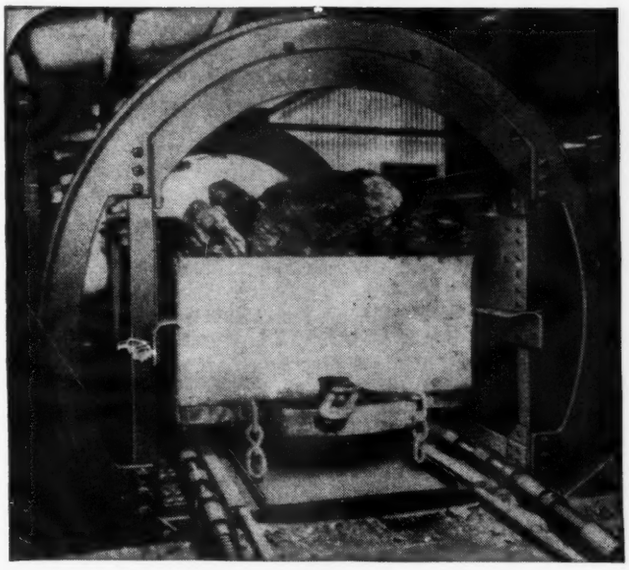
THE COLUMBINE MINE EQUIPMENT CO., INC.

1669 BROADWAY, DENVER 2, COLORADO

... Three and one-half million dollars in new and nearly new coal mining machinery and equipment

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

Complete Liquidation . . . Immediate Delivery

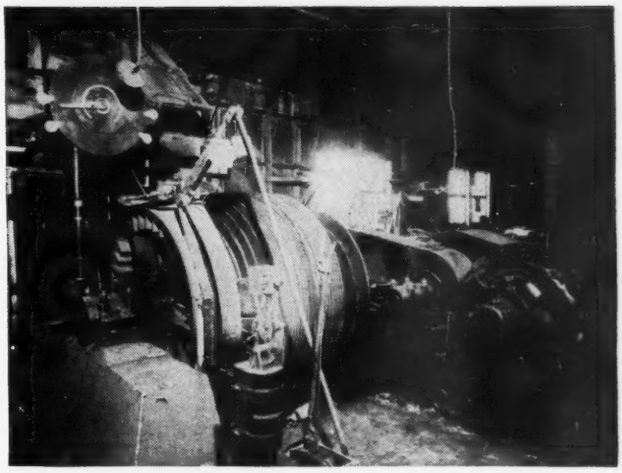


ROTARY CAR DUMPER
Fast Dumping of Coal Cars

HERE ARE SOME OF THE HARD-TO-GET OFFERINGS

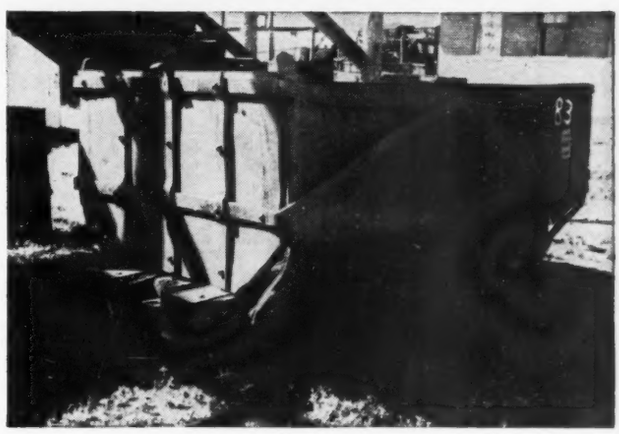
150—2 Ton 36" Ga. Mine Dump Cars, roller bearing.
HAULAGE MOTORS, trolley type locomotive—250 Volt D. C.—electrically driven, 36" gauge, General Electric, Westinghouse, Jeffrey and Goodman.
COAL MINING MACHINES—29 L-E "Arcwall" Jeffrey mining machines mounted on Joy electrically driven caterpillar trucks.
Goodman Shortwall No. 112 mining machines.
Goodman 36" Gauge TRUCKS, Type "M."
MINING MACHINE TRUCKS—Joy "T-1."
MOTOR GENERATOR SETS—1 set 225 H.P. connected to Ridgeway 150 K.W. generators, with panelboards, A.C. and D.C. meters and transformers complete. 1 set 300 H.P. connected to Ridgeway generators, 200 K.W., complete with panelboards, A.C. and D.C. meters and transformers. And others.
BATTERY CHARGING UNITS—Joy, Westinghouse, Hobart Bros. Co., Electric Products Co.
MOTORS—A.C. and D.C., all types, 1 H.P. to 300 H.P., starting compensators and switches.
TRANSFORMERS—General Electric, Westinghouse, 7½ KVA, 37½ KVA and 150 KVA.
BOX CAR LOADERS—Ottumwa—Manerre.
PUMPS—Geared and centrifugal—motor and belt driven—Gould, Demming, and Myers.
FANS—American Blower, Sturdevant.
TIPPLE—3 track tipple consisting picking screens, grizzlies, car retarders, end dump, belt conveyors, elevator bucket conveyors, box car loaders complete.
VIBRATOR SCREENS—Ty-Rock Tyler F-600 2 surface 5'x10' Screen, full floating.
SHAKER SCREENS—"Marcus" shaker screens.
CONVEYORS—Flight conveyors, elevator conveyors.
COAL CRUSHERS.
RAILS—150 tons 60 lb., 350 tons 65 lb.
SPIKES, bolts, tie plates, frogs, switches, switch throws.
COPPER trolley wire—2/0, figure 8 and 4.0 round.
TROLLEY HARDWARE—Hangers, clamps, frogs, switches, roof hangers.
TRANSMISSION WIRE—Single conductor, 2 conductor, 3 conductor—Neoprene, glass, rubber insulated 2/0 to 500,000 CM.
JOY 7-BU. LOADERS—Caterpillar mounted with high pedestal.
SHUTTLE CARS—Joy 42D storage battery.
ELEVATOR CONVEYORS—Joy.
AIR COMPRESSORS.
MACHINE SHOP—Complete.
ELECTRIC SHOP—Complete.
CARDOX PLANT—Complete.
BATTERIES—Exide and Gould Ironclad, 24 cells.
$150,000.00 WORTH of new parts, bearings, gears, bolts, nuts and screws for Joy, Jeffrey, Goodman, Ottumwa, Manerre, General Electric, Westinghouse, Demming, and other popular manufacturers' equipment.

ALSO THOUSANDS OF ITEMS TOO NUMEROUS TO MENTION.



Cornical Drum Hoist, 300 HP, Drum 8'-6" Dia. x 72" wide

Phillip's Crossover Dump and Car Retarder



Tipple Car, 2 Ton, 36" Gauge

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

CALL MOORHEAD FOR MINING EQUIPMENT

LOCOMOTIVES

3—20T Jeffrey and GE 500 V. 42" ga. (Can be rewound 250V.)
2—8T Goodman Perm. 500 V. 42"/44" ga. gath. (Can be rewound 250V.)

Rotary Con. & MG Sets (3 ph. 60 cy.)

640 KW Al. Ch. 250 v.—800 HP Syn. 2300 v. (available 2 months).
500 KW West. 250 v.—2200 v. 80% P.F.
300 KW West. 250 v.—450 HP 35% P.F.
150 KW West. 125 v.—225 HP. 2,200 v.
1—150 KW Ridg. 250 v.—225 HP. Syn. 2200 v.
100 KW Burke 125 v.—2300/440/220 S.n.
100 KW G.E. 250 v.—150 HP. 2300 v. Ind.
90 KW West. 60 v.—220/440 v. sq. Cg.
2—75 KW Star Elec. 250 v.—112 HP. Syn. Motors 440/220/3/60
75 KW West. 75 v.—220/440 v. sq. Cg.
50 KW G.E. 125 v. 75 HP G.E. 2200 v. 440/220 v. 3
New 10 KW 125 v. 220/440/3 60.
7½ KW Wooton 125 v. 10 HP. Wooton Vert.

GOODMAN SHAKER CONVEYORS

3—Goodman G 20 Shaker Conveyors with 250 v. 20 HP motors, also Goodman No. 3 Duck Bills.

MINING MACHINES

1—35B Jeff. Perm. 250 v. 7½ Jeffrey Chain & Bar
412G3 Goodman AC Mches., 6½' bar.

STORAGE BATTERY LOCOMOTIVES

1—6/7 Ton Jeffrey 44" Ga.
1—6 Ton G.E. permissible 36/44 Ga. HM 825 BB.
4 Ton 36" Ga. Atlas 2 BB Motors.
1—5½ Ton Ironton Type A 36/42" Ga.

Haulage & Gathering Locomotives

13 Ton Westgh. 250 v. 36" or 40" Ga.
2—6-ton G.E. 250 v. HM 803 BB Motors, 36" Ga. O.S. Rolled Steel frame with flat top motor driven reel.

COAL CRUSHERS

18x24 and 18x30 New Scottdale bdl. roll.

DC MAGNETIC STARTERS

New 230 v. DC Magnetic Cutler Hammer Starters, 25, 40, 50, 60, 75 & 100 HP.—150 H.P

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
1400	West.	1200	Syn.	New 1 P.F.
1000	West.	1200	Syn.	New 2 P.F.
750	West.	1200	Syn.	New B P.F.
435	G. E.	450	Syn.	ATI
300	G. E.	365	S.R.	MT 415-25cy.
300	West.	1800	S.R.	CW
300	G. E.	450	S.R.	IM
250	Al. Ch.	600	S.R.	ANY
125	West.	277	Syn.	
100	G. E.	500	S.R.	M 1-25-cy.
80	G. E.	900	S.R.	MTC
75	G. E.	600	S.R.	IM
75	West.	690	S.C.	CS
50	West.	560	S.R.	CW 658 D
50	G. E.	900	S.R.	1-M
50	G. E.	720	S.C.	1 K
25	Cr. Wh.	600	S.R.	
10	West.	1200	S.C.	CS

HOISTS, CRANES & PUMPS

400 HP Vulcan conical drum shaft Hoist
100 HP Vulcan fixed drum 100 HP G.E. S.R. Motor
1—50/75 HP 2 drum Meade Morrison slope
40 HP Ligerwood sgl. ft. drum geared to A.C.
25 HP sgl. friction Hoist—230 v. DC Motor.
15 HP Ottumwa sgl. fr. tdr.—15 HP. SK 230 v.
10 Ton Larry Car. 500/250 v. DC.
10 HP Fridy Car Puller. AC. Motor.
4—10 Ton Chisholm Moore Chain Hoists
2 Fairmont Car Retarders.
4—2720 GPM 85' Le Courtney Bronze fitted 10".
1—700 GPM 60' Wheeler Bronze Fitted 5" Cent.
625 GPM 12' Hd. De Laval 10 HP 230 v. DC.
150 GPM 52' Hd. Le Laval 5 HP 230 v. DC.

DC MOTORS, GENERATORS, 230/250 v.

HP	Make	Speed	Wdg.	Type
1200KW	Al. Ch.	750	cpd.	500 v.
1500	West.	600	sh.	600 v.
375	West.	430/860	sh.	
300KW	West.	1200	cp.	SK
175	G. E.	475	ser.	MD 109
150KW	West.	1200	cp.	SK
130	G. E.	550	ser.	CO 1812
125	West.	450/1000	sh.	SK 193
100	G. E.	480	ser.	MD 108
60	West.	1750	sh.	SK 1207
50	Northern	600	ser.	K
50	G. E.	250/1000	sh.	RF16
50	Reliance	1750	cp.	166 T
40	G. E. (Vert.)	1750	cp.	CD 93
40	Roth	1500		
30	West.	1750	sh.	SK 93
25	West.	32-975	sh.	S
20	West.	1150	sh.	SK 63
15	West	800	cp.	SK 93
15	Wh.	800	sh.	CM
15 (4)	C. Wh.	1400/1700	sh.	CM
13	West. (Enc.)	825	cp.	SK 113
10 (2)	G. E.	1750	sh.	CD
7½	G. E.	1750	sh.	RL
5	Reliance	1750	sh.	14 T

AIR COMPRESSORS

755 CFM Chic. Pneu. 2 stage Belted.
355 CFM Chic. Pneu. Type NSB, 12x10 Belted.
273 CFM Ing. Rand ERI—10x10.
173 cu. ft. 100 lb. Pres. Chic. Pneu. Belted.
1—90 cu. ft. 100 lb. Pres. Chic. Pneu. Belted.
1—75 cu. ft. 100 lb. Chg. Pneu.-AC Motor.

AC MAGNETIC STARTERS (3 ph. 60 cy.)

2—700 HP West. 2300 v. Syn. Motor Starters.

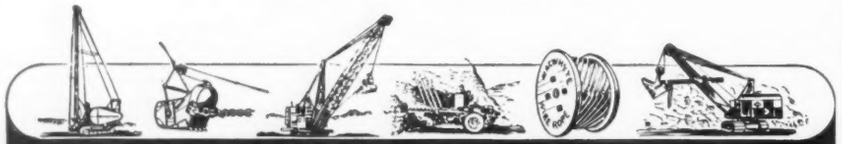
Moorhead Electrical Machinery Co. Mayflower 7900 Pittsburgh 19, Pa.

Serving the Coal Industry for more than a Quarter Century

SHOVELS - DRAGLINES - DRILLS

120B Bucyrus-Erie 4 yard Electric Shovel.
621S Page Diesel Dragline. 135' boom, 6 yard bucket.
Model 1055 P & H Combination 3 yard Shovel and Dragline. 28' boom, 19' stick, 3 yard dipper; dragline boom 90', 3 yard bucket, Buda diesel engine. Machine 1-½ years old. Located in New York State.
955 P & H Dragline. 80' boom, 3 yard bucket, D17000 Caterpillar engine. Located near Hazleton, Pennsylvania.
Model 95 Northwest Dragline. 80' boom, 2-½ yard bucket, Light Plant, Murphy diesel engine. Completely overhauled. Located near Hazleton, Pa.
585 Link-Belt diesel dragline. 85' boom, 2-½ yard bucket, D17000 Caterpillar engine, 1944 machine. Located near Hazleton, Pa.
54-B Bucyrus-Erie 2-½ yard Standard Shovel. Buda diesel engine. Located near Hazleton, Pa.
802 Lima Diesel Dragline. 75' boom, 2-¼ yard bucket, Waukesha-Hesselman engine. Located near Hazleton, Pa.
Osgood Chief 2 yard shovel. D17000 Caterpillar engine. Located in Eastern Pennsylvania.
955 P & H Combination 2 yard Shovel and Dragline. 70' dragline boom, 2 yard bucket; 26' shovel boom, 18' stick, 2 yard dipper. Buda diesel engine. Located New York State.
Osgood Victor 1-¾ yard Combination Shovel and Dragline. 23' boom, 18' stick, 1-½ yard dipper, 60' drag boom, 1-½ yard bucket, D13000 Caterpillar engine. Located in Central Pennsylvania.
Model 77 Lorain Shovel. 1-½ yard dipper, D13000 Caterpillar engine. Machine is one of the last 77's built. Located near Hazleton, Pa.
Model L-55 Lorain 1 yard shovel. Waukesha-Hesselman gas engine. Completely overhauled.
Lima Paymaster ¾ yard Combination Chain Crowd Shovel and Backhoe. 18' boom, 15' handle, ¾ yard dipper, GMC diesel; backhoe has 8'7" arm and ¾ yard bucket. Machine worked four months. Located near Hazleton, Pa.
Model 44 Loomis Clipper Blast Hole Drill with new Hercules engine. Located near Hazleton, Pa.

We carry in stock various sizes of Page automatic dragline buckets. We may have the size you need for immediate delivery.



FRANK SWABB EQUIPMENT CO.
Hazleton National Bank Bldg., Hazleton, Penna. Phone: 4916

REBUILT MINING MACHINES

3—112 AA Goodman Universal DC
2—112 G3A Goodman Universal 220 volts AC
2—12 A and 12 AB Goodman 250 volts DC
4—CE 7 Sullivan AC and DC
1—35 B Jeffrey 250 volts DC

LOCOMOTIVES

1—6 ton Westinghouse 250 volts
1—6 ton GE 250 volts
1—6 ton Goodman type 2600 250 volts
1—5 ton Mancha Storage Battery Locomotive 42 inch Track Gauge Height 40" complete with Storage Batteries and Charging Panel

LOADING MACHINES

2—7 BU Joy 250 volts 42" Gauge

THOMAS GILLESPIE & SONS

State Rd. 67 Bicknell, Ind.
Phones 179 and 149-L 149-K

Electrical Equipment

Converters, Motor Generator Sets, A. C. & D. C. Motors, Control Equipment and Transformers.
We build equipment to fit your requirements. Over 25 years engineering background.

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P.O. BOX 3227
TEL. 38-136
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NEW and REBUILT

HIGH GRADE TOOLS

30" King Vertical Boring Mill, 1 Head.
24", 36" & 42" Bullard Vertical Turret Lathe.
1—G & L Model "A" Hydraulic Surface Grinder.
3" Bar Fosdick Horizontal Boring Mill.
3½" Bar Lucas Horizontal Boring Mill.
2½" Giddings & Lewis Horizontal Boring Mill.
2 1/3" Giddings & Lewis Horizontal Boring Mill.
18"x10' Boye & Emmes Lathe.
20"x12' Boye & Emmes Lathe.
24"x16' American Geared Head Lathe.
2' to 6' Pla'n Radial Drills.
21" Cincinnati Bickford Upright Drill.
16" and 24" G & E Shapers.
24"x24"x8' Gray Planer, 1 head.
30"x30"x10' Cincinnati Planer, 2 Heads.
150-ton Wheel Press.
New No. 3 Davis Keyseating Machine.
Also various other machine tools.

Send us your inquiries

Cincinnati Machinery Company, Inc.
217 E. Second St. Cincinnati 2, Ohio

BARGAINS IN USED EQUIPMENT

QUOTATIONS WILL BE MADE RECONDITIONED AND GUARANTEED, OR ON AN AS IS BASIS. ALL EQUIPMENT IN GOOD WORKING CONDITION—SOME PRACTICALLY NEW.

COAL CUTTERS

4—Sullivan CE-7 AC Short Wall, complete with Standard and Tip-turn Trucks, most machines with Power Cable.

TROLLEY LOCOMOTIVES

2—7½ Ton Goodman's, 36" Gauge, 250 Volt D. C.

MACHINE SHOP EQUIPMENT

2—Drill Presses 16" to 26".
1—200 Amp. Smith Welder—on wheels.
1—18" Gould & Eberhardt Shaper.
1—Power Hack Saw, B. D.
Bolt & Pipe Threaders, Chain Blocks, Swing Cranes with Crawls, Wood Planer, Saw Table, Hand Shears, etc.

COAL WASHING EQUIPMENT

2—Rheolaveur Launders, complete with Steel Supporting Frame.
1—60" Dia. Dividing Table, direct connected to 2 H. P. D. C. Motor.
1—Gallgher Auto. Sampler with adjustable stroke & direct connected to a 1/6 H. P. Motor.
1—12' x 10' Steel Hopper Bin.
1—70' x 12' Dorr Thickener Tank, complete with mechanism.

COAL CRUSHERS

1—36" American Ring Type.
1—24x20 Jeffrey Swing-Hammer Mill.

JOY LOADERS

1—7-BU Joy Loader, Cat Mounted, Low Pedestal, 250 Volts DC. Overhauled and Guaranteed, Permissible Type.

PUMPS

1—2" Marsh, V-Belted to 15 H. P. Motor 150 GPM, 160' Head.
2—10x10 Allis-Chalmers Centrifugal, 1500 GPM, 56' Head, direct connected to a 100 H.P., 2300 Volt Center Drive Motor.
5—5x5 Deming Oil-Rite Piston Pumps—Motorized.

RAILROAD SCALES

3—100 Ton Fairbanks, Steel I Beam Stringers, Inspected by W. W. & I. B. in April, 1947.

STEEL BINS

1—16' x 24' Sectional Steel Bin.
2—10' x 20' Welded Steel Bins.

LARRY CARS

4—Connellsville Larry Cars, Trolley Operated, 6 Ton Capacity.

CONVEYORS

3—24" Belt Conveyors, 15' to 85' Centers, 2 equipped with Ding's Pulleys.
1—30" Belt Conveyor, 370' Centers.
1—30" Belt Conveyor, 70' Centers.
1—36" Belt Conveyor, 50' Centers.
1—28" Apron Conveyor, 21' centers. Flight Conveyors from 12" to 30" up to 170' centers.

RAILS

50 Tons—65 lbs. Relayers. 25 Tons—40 lbs. Relayers.

MINE FANS

1—8-H60 Aerodyne Exhausting Fan, with Air Locks, Hood, etc. with 75 H.P. Motor—Purchased new in 1942.

HOISTS

1—No. 22 Vulcan, with Man Cage, 30' Steel Head-frame and 40 H.P. Single Speed Elevator Type Motor, equipped with Solenoid Brake. (Hoist purchased new in 1942).
1—Single Drum Gasoline Hoist, direct connected to 2⅝ x 4¼ Wisc. Gas. Engine.
1—15 H.P. Single Drum Hoist, direct geared to motor with Controller and Grids.

PIT CARS

160—Card Iron Works R. B. Pit Cars, 36" Ga.
1—Card Iron Works Rock Car, 90 Cu. Ft. Cap.

MISCELLANEOUS

AC & DC Motors, new & used, from 2 H.P. to 75 H.P.
R.C. Stranded Copper Wire, 2/0—4/0 & 350,000 CMS.
Trolley Wire 2/0 & 4/0 Rd. & Fig. 8.
Trolley Hangers and Supplies, New and Used.
Wall Telephones, Jacks, $20,000.00 worth of New Supplies.
New CE-7 Sullivan Coal Cutter Parts.
New and Used Wire Rope, ⅜" to 1¼".
750' New 3-Cond. No. 6 All Rubber Power Cable.
1—3,000' Tramway, complete with buckets, etc.
1—750' Jig-back Tram, complete with motor.
Office Equipment, Electric Calculators, Typewriters, Desks, Filing Cabinets, etc.
1—Stiff-Leg Derrick, with crabs and cable.
3—Steel Lockers, 6 and 9 Compartments.
6—200 Gal. Galvanized Oil Tanks.
12" and 18" I Beams.
Bucket Elevators.
1—50 H.P. Cutler-Hammer DC Controller, with 2 Banks, Grids, Panel, etc.
Switchboard Equipment for DC Motors.
Fire Extinguishers—1 Qt. to 5 Gal.
5—Permissible Type all service gas masks and 38 Permissible Cannisters.
Double and Single Electric Gongs.
1—Ro-Tap Testing Shaker.
1—No. 5 Buffalo Forge Blower, direct connected to 3 H.P. A.C. Motor.

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MACHINERY AND SUPPLY COMPANY

SUITE 904, EQUITABLE BUILDING **DENVER 2, COLORADO**

C. J. Parrish, Mgr.

Phone: Alpine 2803
Yards: Denver and Florence, Colo.

BARGAINS IN LATE TYPE LOCOMOTIVES

IMMEDIATE SHIPMENT

6—6-ton General Electric Gathering Locomotives
Serial Numbers 12198, 12199, 12200, 12201, 12202, 12203
Type LME 2C6-F16
Motors—HM-835, 250 volt, ball bearing

Wheel base	44"	Outside steel tired wheels	28"
Track gauge	42"	Speed	4.8 M.P.H.
Height over frame	29"	Length overall	13'6"
Inside armorplate frame	1½"	Drawbar pull	3000 lb.

Equipped with contactor controls, steel strip resistances, Timken roller bearing axles and late type General Electric motor-driven, floating-type gathering reels with 500' of practically new cable.

2—6-ton General Electric Gathering Locomotives
Serial Numbers 10093 and 10096
Motors—HM-801, 32 H.P., 250 volt, ball bearing

Wheel base	48"	Speed	6½ M.P.H.
Track gauge	42"	Drawbar pull	3500 lb.
Outside armorplate frame,	1½"	Height	29"
Inside steel tired wheels	28"	Controller Type	B-62-A

Equipped with equalizing springs and CY-21 floating-type, motor-driven gathering reels and good cable, and completely rebuilt.

6—8-ton General Electric Gathering Locomotives
Serial Numbers 9653, 9654, 9655, 9656, 9657, 9658
Motors—HM-839, 250 volt, ball bearing

Speed on three	6½ M.P.H.	Length overall	13'6"
Speed on other three	4.8 M.P.H.	Wheel base	44"
Inside armorplate frame	2"	Drawbar pull	4000 lb.
Outside steel tired wheels	29"	Track gauge	42"
Height overall	31"	Controller type	R-109 Form M

Equipped with steel strip resistances and CY-21 motor-driven cable reel and 500' of very good cable.

2—8-ton Goodman Gathering Locomotives
Serial Numbers 3846 and 3847
Motors—32-A-1-4-T, 250 volt

Wheel base	46"	Width	48"
Inside armorplate frame	1½"	Draw pull	4000 lb.
Outside steel tired wheels	28"	Track gauge	42"
Height	30"	Controller Type	LM-64-D
Length overall	13'		

Equipped with steel strip resistances, motor-driven, horizontal gathering reel and 500' of practically new cable.

All of the above Locomotives can be easily changed in to 36" or out to 44" or 48" gauge.
We also have about $15,000.00 worth of new parts and supplies, armatures, extra trucks, etc. for the above Locomotives.

600—END-DUMP 3½-TON STEEL MINE CARS

Height overall	46"	Steel bodies	3/16"
Length of body	9'	Drawbar	1" x 4'
Overall length	10'2"	Oak bottoms	3-3/4"
18" Timken roller bearing wheels		3—Link couplings 3—Binders	
Wheel base	36"	Spring draw head one end	
Width	60"	Track gauge	42"
Axles	3"		

Frank J. Wolfe

We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.

COAL MINE EQUIPMENT SALES COMPANY
306-307 BEASLEY BUILDING L. D. PHONE 34 TERRE HAUTE, INDIANA

MOTOR GENERATORS

500 KW GE. SYN., 575 V. 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. Complete Manual Switchgear.
400 KW WEST. SYN., 575 V., 2300/4000 V., 3 Ph., 60 Cy., 720 RPM. Complete Manual Switchgear.
300 KW GE. SYN., 275 V., 2300/4000 V., 3 Ph. 60 Cy., 1200 RPM. Complete Manual Switchgear.
250 KW GE. Syn., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 720 RPM. Complete Manual Switchgear.
150 KW WEST. SYN., 275 V., 2300 V., 3 Ph., 60 Cy., 900 RPM. Complete Manual Switchgear.

SYNCH. CONVERTERS

300 KW GE., 575 V., 6 Ph., 60 Cy., 1200 RPM. Pedestal Type. 2300/4000 V. Transformers and Switchgear.
300 KW WEST., 575 V., 3 Ph., 60 Cy., 1200 RPM. Pedestal Type. 13200/6600/4000/2200 V. Transformers and Switchgear.

LOCOMOTIVES

13-T JEFFREY, 250 V., MH-110 Mts. 42"-32" Ga.
10-T JEFFREY, 250 V., MH-110 Mts., 42"-32" Ga.
10-T WEST., 250 V., 907-C Mts., 36"-44" Ga.
8-T WEST., 250 V., 906-C Mts., 42"-48" Ga.
6-T G.E., 250 V., HM-701 Mts., 22"-32" Ga.
6-T WEST., 250 V., 903-B Mts., 22"-30" Ga.
Each unit listed above is owned by us and is available now for immediate purchase.

Wallace E. Kirk Company
501 Grant Building, Pittsburgh, Pa.

RAILS

20 lbs. to 110 lbs. New Rails
25 lbs. & Heavier Relay Rails

TRACK ACCESSORIES

Tie Plates—Bolts—Spikes
New & Used Ties
Angle & Splice Bars

SWITCH MATERIALS

Frogs—Switches
Guard Rails—Switch Stands
New & Used Switch Timbers
"One Piece or Carload Quantities"

MORRISON RAILWAY SUPPLY CORP.

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TRACK ACCESSORIES

from 5 Warehouses

- PROMPT SHIPMENTS
- FABRICATING FACILITIES
- TRACKAGE SPECIALISTS

EVERYTHING FROM ONE SOURCE

L. B. FOSTER COMPANY
PITTSBURGH • CHICAGO • NEW YORK
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LOCOMOTIVES & CRANES

80 ton Lima 6 wheel Switchers. New 1944.
65 ton Whitcomb Diesel-Electric. New 1944.
50 ton Gen. Elec. Diesel-Electric.
70 ton Porter Fireless steam locomotive.
30 ton Plymouth Gas Locomotive. New 1944.
2 yd. Lima Diesel Crawler Crane. 100' bm.

MISSISSIPPI VALLEY EQUIPMENT CO.
511 Locust St. St. Louis, Mo.

RELAYING RAIL

TRACK ACCESSORIES
MIDWEST STEEL CORP.
Gen. Off.: CHARLESTON 21, W. VA.
Warehouses
CHARLESTON, VA.
KNOXVILLE, TENN. • PORTSMOUTH, VA.

RAILS—CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

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STRIPPING & MINING EQUIPMENT

Coal Crushers • Vibrating Screens
Conveyors • Electric Coal Drills
Electric Generator Sets • Mine Fans

THE INDUSTRIAL EQUIPMENT CORP
(Established 1902)
910 First National Bank Bldg., Pittsburgh 22, Pa.
Warehouse: Carnegie, Pa.

Bucyrus-Erie 34B 1½-yd. Diesel shovel.
B-E 50B shovels, Diesel, electric, steam
B-E 8-yd. electric shovel-dragl., 320B
Draglines, 1½, 2, 2½, 3, 6, 20 yds.
Whirley portal gantry cranes, elec., (2)
Plymouth 10-ton gas locomotive, 36" ga.
Steam locos., 17 to 67 tons, various gauges.
Guiberson diesel engines, radial, 200 HP, new
Caterpillar tractors, D-4, 50, 40, R-4, D-8
Generators, 1625 KW a.c.; 1200 KW d.c.
H. Y. SMITH CO., 828 N. B'way, Milw. 2, Wis.

SPECIAL OFFERING

Immediate Delivery

62—50-Ton, All Steel, Twin HOPPER CARS, 1,880 Cu. Ft. Capacity Cast Steel Side Frames and Bolsters.

Good Condition

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IRON & STEEL PRODUCTS, INC.
43 years experience
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"ANYTHING containing IRON or STEEL"

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One of our clients offers for sale a small wood tipple complete with shaking screens, three loading booms, refuse conveyor and crusher. This offering is completely equipped and it may be purchased for a fraction of its replacement value. A Marion 1½ yard gasoline powered coal loading shovel in excellent condition is also available. All subject to prior sale. If interested wire, write or phone for further particulars.

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Terre Haute, Indiana

REBUILT EQUIPMENT — READY TO SHIP

MOTOR GENERATOR SETS—250 v. D.C.
(Motors 220/440 or 2200 v., 3 ph. 60 cy.)

No.	KW.	Make	Speed
1	200	G. E.	1200
1	175	West.	1200
1	150	Ridgway	900
1	125	Allis Chal.	1150
1	110	Westg.	700
1	100	Allis Chal.	1150
2	75	G. E.	1750
1	50	Ridgway	1200
1	50	Ideal	1750
3	40	West.	900
1	30	West.	1200
1 New	25	Burke	1800

D.C. GENERATORS — 250 v. D.C.

No.	KW.	Make	Speed
1	250	Allis Chal.	1200
1	175	G. E.	700
3 New	135	G. E.	1150
1	125	West.	560
1	125	Allis Chal.	1150
1	110	West.	700
1	100	Allis Chal.	1150
1	75	West.	750

A. C. GENERATORS—2200/4000/440/220 v.

No.	KW.	Make	Speed
1	125	West.	257
1	450	Elec. Machy.	120

D.C. MOTORS—230 volts

No.	H.P.	Make	RPM.	Type
1	175	G. E.	550	MD
3 New	150	G. E.	875	CDM
2	150	Star	1800	F-92
3 New	133	G. E.	875	CDM
1	125	Allis Chal.	850	E. R.
1	80	West.	450	
3	40	West.	625	MC
3	40	Cr. Wh.	1700	CM
1	30	Cr. Wh.	1750	CMC
1 New	25	West.	600	SK-113
1	25	F. M.	950	CP
1	25	West.	1100	SK

230 V. D.C. MAGNETIC STARTERS AND CONTROLLERS

456—New 1 HP. Cutler Hammer across the line.
111—New 1 HP. Cutler Hammer across the line.
30—New, 2 HP. Cutler Hammer across the line.
55—New 5 HP. Cutler Hammer drip proof 2 step current limit OL and LV.
58—New 7½ HP. Cutler Hammer.
60—10 HP. Cutler Hammer Magnetic.
12—10/15 HP. 230 V. Westinghouse Magnetic Drip Proof Controllers. 2 steps acceleratiion thermal overload relay with stop, start and reset buttons.
9—New 10/15 H.P., 230 v. G.E.
10—New 20/35 HP., 220 v. Ward Leonard Magnetic.
10—New 40 HP. 230 v. G.E. Magnetic.

A.C. MOTORS—4000/2200/220/440 V.—3-Ph., 60 Cy.

No.	HP.	Make	Rpm.	Type
1	500	Elec. Mach.	120	Syn.

CONVEYORS

3—G-20 Goodman Shaker Conveyors each with a Goodman Duck Bill conveyor with motor equipment with 250 V. motors.

PUMPS WITH A.C. or D.C. MOTORS

Qua.	Gpm.	Head	Kind	Make
3	1200	300	Cent.	Worthington
3	1100	323	Cent.	Worthington
3	1000	376	Cent.	Worthington
3	900	365	Cent.	Worthington
3	800	378	Cent.	Worthington
3	800	150	Cent.	Worthington
3	735	161	Cent.	Worthington
3	665	168	Cent.	Worthington
3	600	182	Cent.	Worthington
1	600	105	Cent.	Dayton Dowd
1	600	100	Cent.	Morris
1	532	189	Cent.	Worthington
1	500	115	Cent.	Dayton Dowd
1	500	123	Cent.	Morris
1	450	40	Cent.	Gardner Denver
1	400	50	Cent.	Dayton Dowd
1	400	140	Cent.	Morris
1	335	60	Cent.	Dayton Dowd
1	300	145	Cent.	Morris
1	300	125	Cent.	Dayton Dowd
1	244	60	Cent.	Dayton Dowd
1	210	60	Rotary	Nat'l Transit
2	200	125	Cent.	Worthington
1	200	72	Cent.	Morris
1	200	125	Cent.	Dayton Dowd
2	180	150	Cent.	Worthington
8	180	10	Cent.	Allis Chalmers
8	170	12	Cent.	Allis Chalmers

LOCOMOTIVE MOTORS

3—Westinghouse MH-58 36 H.P., 500 v., 430 rpm.

HOISTS or WINCHES

200—1½-ton Hand Cranked ratio 27:1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of ¼" cable, ratchet type brake, push button release.
1—Single drum triple reduction, drum 28" dia. 20" face, 1" flange grooved for ½" rope, motor pinion 26 teeth, 15 H.P. 230 v. D.C. Motor.

CAR PULLERS

100—Brand New with ¼" cable, 1½ and 2 ton A.C. or D.C. Motors.

TRANSFORMERS

20—NEW 25 kva., 460 v. pri. 230/115 v. sec. 1 ph. 60 cy. Allis Chalmers.

COMPRESSORS

1—315 CFM. Ingersoll Rand Portable 100 lbs. pres., driven by 105 HP. Waukesha Oil Engines, 860 rpm.
10—240 CFM Westinghouse 3 cyl. vert. 150 lb. pres. with dir. con. 54 H.P. Westinghouse slipring Mtrs. 220/440/3/60 Automatic Unloaders.

COAL DRILLS

2—Jeffrey 250 V.D.C.

ENGINE GENERATOR SETS

6—New 1 kw., Homelite portable, 14.25 Gas
3—New 1½ kw., Homelite, 115 v. 1 ph., 60 cy. portable Gas
3—1½ kw., Homelite, 14.25 v. D.C., portable Gas
6—2 kw. NEW Homelite, 28.5 v. D.C. Gas
3—5 kva. 120/240 v., 1 ph., 60 cy., dir. con. to 6 HP. Witte DIESEL.
2—10 kw., 120 v., D.C. 1200 rpm., dir. con. to Hercules Diesel
3—New 25 kw. 120/208 v. 3 ph. 60 cy. Westinghouse dir. con. to 4 cyl. 70 HP. Leroi Gas Engine
2—30 kw. G.E. 125 v. Buda DIESEL
1—35 kw., Ridgway 220/3/60 Steam
2—30 kw., 110/220 v. 60 cy. 1200 rpm Rogers DIESEL
1—100 kw. 250 v. D.C. Superior DIESEL.
1—125 Kva., 220 v., 3 ph., 60 cy., Erie Ball STEAM

BARGAINS—75 NEW VENTILATING FANS. Ranging from 250 cfm to 16000 cfm with direct connected totally enclosed, ball bearing A.C. and D.C. Motors.

"Write for Stocklist"

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH [6], PA.

Montrose — 5800

FOR SALE

CRUSHERS

1—Stephens Adamson 30x30 double roll crusher. Will crush from 2" down to 1¼".
1—Link Belt 36x60 double roll crusher, equipped with gear drive.
1—American Pulverizer crusher, No. 1627. Type AC, machine number AC3B, crushes from 20" down to ½".
1—Jeffrey single roll crusher, size 36x36, No. 4507. Will crush maximum lump of 20" at rate of 250 tph to a product of 1¼" when operating at 300 rpm. Direct connected by flexible coupling to 75 HP. GE motor, 3/60/440, speed full load 885, ball bearing, fan cooled.

FAN

1—Bayley No. 17, Plexiform fan, type F, wheel dia. 93½" circumference. 24.478 ft. outlet area. 39.376 sq. ft. Capacity ranges from 39.376 CFM at outlet velocity of 1,000 to 141,759 CFM at outlet velocity of 3,000.

LOCOMOTIVES

1—4 ton Mancha Battery locomotive, equipped with Gould Batteries, 36" gauge.
1—4 ton Westinghouse locomotive, ball bearing 36" gauge, class 4-2-15-C-253.
1—5 ton Goodman locomotive, type W12A5, 42" gauge, 250 volts, DC.
1—6 ton Goodman locomotive, 36" gauge, 250 volts, DC.
1—6 ton Goodman locomotive, type 3304T, ball bearing, 36" gauge, 250 volts, D.C.
1—6 ton General Electric locomotive, classification LM2T6MM5, R86E type controller, 36" gauge, 250 volts, D.C.
2—8 ton Goodman locomotives, ball bearing, 36" gauge, type 32A04T.
1—10 ton General Electric locomotive, ball bearing, 36" gauge, 250 volts, D.C.

MINING MACHINES

2—Sullivan type CH8, AC longwall mining machines, 3 phase, 60 cycle, 220 volt, 30" cutter bars, complete with 300' each of 3/conductor mining machine cable.
2—Goodman Universal mining machines, type 112-G3, 36" gauge.
1—Jeffrey 35BB, AC shortwall mining machine, 6' cutter bars, complete with tip turn truck, cable and reel.
1—Goodman Universal mining machine, 112AA, 42" gauge, 250 volts, DC, 8' cutter bar.

MOTOR GENERATOR SETS

1—50 KW motor generator set, consisting of: 75 HP. Crocker Wheeler DC motor, compound wound, No. 254053, 230 volts, 273 amps, type CCM, size 50H, connected to 75 HP. Westinghouse AC motor, 220 volts, 1,170 RPM, 3 phase, 60 cycle, 166 amps, type CS, No. 1504169, complete with compensator for AC end, but no switchboard for DC end.
1—50 KW motor generator set, AC end, 2,200 volts, DC end 250 volts, complete with compensator, apl switchboard. Perfect condition.

TIPPLES

1—5 track steel tipple complete with shaker. Capacity 2,500 per day.
1—Steel tipple complete with shaker and concrete silos. Capacity 1,000 tons per day.

HOISTS

1—Ottumwa Iron Works single rigid cylindro-conical drum hoist, serial number 4080, complete with remote control and hydraulic brakes, constructed for following hoisting conditions: Weight of cage 6,000 lbs., weight of car, 1,600 lbs., weight of coal average 2,500 lbs., total cage travel 277 ft. (HMD) size of rope 1 1/8", trips per hour 78, rest period 15 sec. Balanced hoisting without slack rope, end lift. Post brake 72" diameter, 8" face. Direct connected to Western Electric 150 HP motor, 3 phase, 60 cycle, 440 volts, slip ring speed full load 700 RPM, compete with automatic switchboard.

Other types and sizes of hoists, with and without motors.

PUMPS

All sizes and types of pumps.

We are distributors for John A. Roebling's Sons Company wire rope and fittings.

GAVENDA BROTHERS, Inc.

CANTON, ILLINOIS

MINING MACHINES

Jeffrey: 2—25B, 28A, 250 V. 1—24B Low Vein. 4—29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving hear for 29C. 2—Longwall 24B.
1—Joy Caterpillar truck for 29B or 29C.
Goodman: 12A, 12AB, 12AA, 12G3A. Shortfalls. 424, 24B, 124EJ Slabbers.
1—12G3, 220 volt and 2—17, 12DA, 250 volt, 12 DA, 500 volt.
2—Permissible Type 12CA, 6-112AA. Motors for 212 G3—Volts 220. Phase 3.
1—Hitch Cutter for Cross Head timbers.
2—Goodman Slabbing Machines, permissible type, 250 and 500 volts.
Sullivan: CE7, CE9, 220 Volt, 3 Phase.
1—CE7 machine, 250 v., D.C.

SUBSTATIONS — 275 volts, D. C.

1—150 KW. G. E. MG Set.
1—300 KW. **Westing.** Rotary. As is armature needs rewinding.
1—150 KW. **West.** MG Set.
1—100 KW. **Ridgway** MG Set.
1—200 KW. **H W** Rotary Converter.

LOCOMOTIVES

Goodman: All 250 volts.
1—6 ton, 30B, 43" 1—5 ton.
1—5 ton 8-30 36" gauge.
1—6 ton type 8A. 1 type 33.
1—5 ton type 42 0-4-2.
Westinghouse. All 250 volts.
906 motors and 102 904-115.
Bar steel frames 10 ton, 6 ton, and 4 ton.
G. E.: All 250 volt.
6 ton 803, 44" as is.
6 ton 823, 44".
6 ton 801.
8 ton 839.
1—8 ton type HM 61—36" ga.
6 ton 819-821.

LOCOMOTIVES

5 ton 825, 44" and 36".
8 ton 839.
2 motors for 8 ton 839.
Jeffrey: 8 ton, 250 volts, type MH73. 1—4 ton MH 12. Locomotive motors and Crabs and Reels for Locomotives.

SPARE ARMATURES

Jeffrey: MH110, MH78, MH73 and MH64-350 V. and 500 V. 29B, 35B and 28, 35BB, 35A, 29C, 29L, 35L.
Goodman: 34B, 30B, 30C, 12A, 2600 K and R; 12AB, 12AA, 33-1-4-T, 31-1-4-T, 32-1-4-T.
General Electric: 801, 807, 819, 821, 825, 839, 61.
Westinghouse: 904, 905, 906, 102, 907, YR2, 115. Also 200 KW.
200 KW Westinghouse Rotary Converter Armature: 250 V. Bracket Type, 150 KW G.E. HCC Bracket Type.
Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.
Automat Loader: 1 Myers-Whaley No. 4.
Belt Conveyors: 1 Bucket Elevator Conveyor.
Bit Sharpeners, 2 Sullivan 1 Diamond.
Blue Print Machine: 42" wide, continuous Mercury Arc Light.
2 Loading Booms: 40'x5' with Picking Table.
Bond Welders: Resistance, 1 spot welder.
Circuit Breakers: AC and DC.
Circuit Breakers, Automatic: 250 volt, 600 amps.
Circuit Breakers, Manual: 600 amps to 3,000 amps.
Clam Shell Bucket: 1¾ cubic yard.
Coal Crushers. (double roll) 16"x16", (single roll) 24"x30", 24"x24", 36"x36", 30"x30", 18" x18", 12"x16".
Conveyors: Scraper type.

OTHER ITEMS AVAILABLE

Compressors & Jackhammers, Compensators. A5 Drill, 3-60-220.
Drop Bar Supports: (Gooseneck) 29B and 29C. 1 Revolving head for 29C.
Dumps: Crossover.
Field Frames.
Generators: DC 250-275 volt, 30 KW to 100 KW.
Hoists:
Hoists: Overhead, AC 3-60-440 1 ton and 2 ton. Crabs and Room Hoists.
Lathes: 48"x14' with Taper Attachment and 3-60-220 Motor.
Loading Machines: Myers-Whaley.
2-Myers-Whaley No. 3 and No. 4.
Milling Machines, horizontal and vertical.
Mine Cars.
Mining Machine Trucks, one on catts.
Motors: Miscellaneous and 1—50 HP Fynn Weichsel, 1800 RPM, 220 Volt, Slipring or synchronous Crane type. 1—oilwell motor, 2 speed 575 and 1160 HP, 15' and 36', 440 volts. Slip Ring with control and pole changer and series motors.
Motor Starters and Controllers: AC and DC.
Plants: Diesel Power. Synchronous Motor Starters, full Magnetic Across-the-Line, 3 phase, 60 cycle, 4-150, 4-100 Volts—2,200 H.P. and 6-250 H.P. Westinghouse starters, automatic, magnetic, reversible.
Synchronous motor starters and starters, **1—165** H.P. 440 volt with resistance for slip ring. Motors, 1—100 H.P. 250 v. D.C.
1—Bread mixer with AC motor.
Belting 400 ft. 25".
Pulley flat belt-V and conveyors.
Plants natural gas 300 H.P. with DC.
Generators 250 volts and smaller sizes.
Pumps: Rebuilt and new.
R. R. Switches: 85 lb. and 100 lb.
Slate Larry.

GUYAN MACHINERY COMPANY, Logan, W. Va.

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ARMY FIELD *Telephones*

JOB-PROVED

For most practical 2-way communication—on the surface or underground—*to help reduce operating costs and increase your daily output.* Compact—rugged—portable. Saves time—satisfies the needs of latest mining practices for safety and efficiency. *Performance equals present-day commercial telephones—up to 17 miles!*

NOW WE KNOW from the many orders we have received from mining operations of all types that Army Field Telephones are solving hundreds of communication problems **on-the-job**—between adjoining mines . . . from pit to tipple . . . preparation plant . . . spoil area . . . shop . . . stockpile . . . engineering crew . . . mine-rescue crew . . . to save man hours and speed production.

Anyone can install. Just hook up terminals to any two-strand wire, or single wire and ground; several phones on same line if desired. Operates on standard flashlight batteries—no external power required. Every phone guaranteed. Two phones comprise a set—order as many as you need. Each phone complete with hand generator and self-contained ringer.

NEW—Leather case	$16.25 ea.
Canvas case	15.00 ea.
NEW OR RECONDITIONED—with cases soiled, etc. Performance equals new telephones	10.75 ea.
NEW FIELD PHONE HANDSETS	ea. $3.75 Postpaid
UNUSED W-110B ARMY FIELD WIRE (open storage) 500 ft. $3.50; 1000 ft. $6.50; 1-mile reel	$16.00

WRITE FOR FREE FOLDER ON TELEPHONES

All Prices FOB Sacramento. No COD. In California, add 2½% for sales tax. Shipping weights: Phones—12 lbs. ea.; Wire—500 ft., 14 lbs.; 1,000 ft., 28 lbs.; 1 mile, 164 lbs.

SEND CHECK OR MONEY ORDER **LORIS SALES**

P. O. Box 1896 Dept. 3 Sacramento, Calif.

COAL CUTTING MACHINES

1—35 B Jeffrey Shortwall, 250 V, D.C.
1—35 BB Jeffrey Shortwall, A.C.
1—29 C Jeffrey Arcwall, 250 V, D.C.
1—124 E.J. Goodman Slabbing, 250 V, D.C.
1—36 B Jeffrey, 250 V, D.C.

LOCOMOTIVES

2—6 ton GE Gathering Locomotives with HM 823 motors.

M. G. SETS

1—60 KW, 250 V, D.C. with 100 HP, Synchronous motor.
1—75 KW, 250 V, D.C. with 112 HP, Synchronous motor.
1—150 KW, Ridgeway, 275 V, D.C. 3/60/2200/1200.
1—200 KW, Allis Chalmers rotary converter.

LOADING MACHINES

1—L-600 Jeffrey Loading Machine, track mounted, 250 volt D.C., 42" track gauge.
2—L-400 Jeffrey, same as above.
2—260 Goodman, 250 volt, 44" track gauge, track mounted.
2—7BU Joy Loading Machines, 3 phase, 60 cycle at 220/440 volt.
1—14BU, 250 volt Joy Cat mounted loading machine.
2—Shuttle Cars, complete with battery.

ELECTRIC HOISTS

1—3 ton Shepherd mono-rail, 250 V, D.C.
1—3 ton Euclid, same
1—2 ton Chisholm-Moore, same
2—1 ton Shepherd, 250 V, D.C.

Tippins Machinery Co.

Pittsburgh 6, Pa.

TRACTORS FOR SALE

Caterpillar D-7 with cable angle blade
5 new Caterpillar D-7 with cable straight blades
1 D-8 Caterpillar diesel tractor
1 Link Belt 2½ yd. dragline, new in 1944 with Caterpillar diesel motor

WE REQUIRE:

1 Austin Weston 99H Grader
2 New TD-14's with hydraulic angledozers

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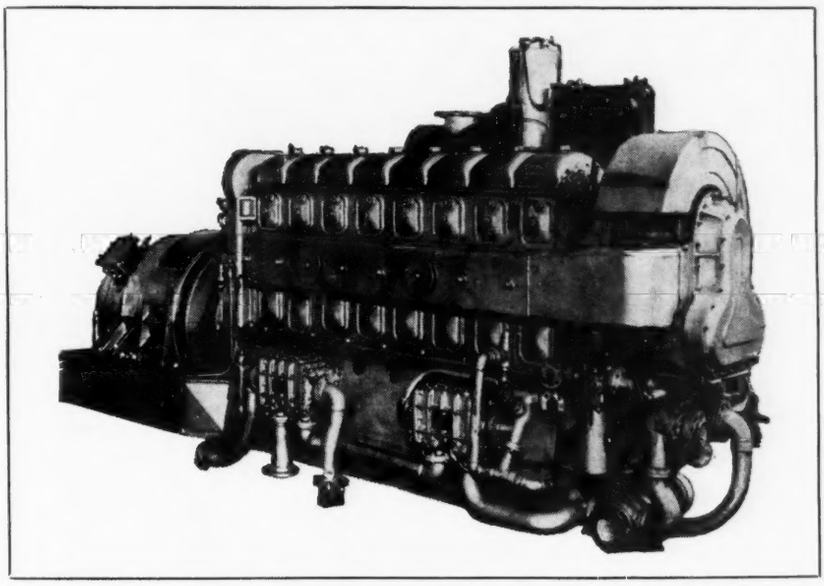

A.C. or D.C.

Quan.	KW	Make	HP	Model	RPM
3	300	De Laverne	448	VO	400
4	300	General Motors	450	8-268A	1200
5	100	General Motors	150	3-268A	1200
6	100	Superior	150	GDB-8	1200

* D. C. Generators—120/240 volts
* A. C. Generators—any voltage

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Some Steam Engines and Boilers available only slightly above the metal price

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IRON and STEEL PIPE
New and Used
Large stocks, all sizes attractive prices

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NEW and REBUILT STORAGE BATTERY
LOCOMOTIVES
1½ to 10 Ton 13" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Pa.

WESTINGHOUSE
TYPE SK—MOTORS
WIRE INQUIRIES COLLECT

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
Rochester 1, N.Y.

VIBRATING SCREENS
CRUSHERS--SCALES
Immediate Shipment

3'x6'—1 deck Vibrat. Screen	$648.00
3'x6'—2 deck Vibrat. Screen	780.00
3'x8'—1 deck Vibrat. Screen	768.00
3'x8'—2 deck Vibrat. Screen	900.00
3'x8'—3 deck Vibrat. Screen	1164.00
All vibrating screens with screen cloth or plate to customer's specifications.	
Stoker Coal Crusher	474.00
Large Coal Crusher	1074.00
15 Ton Truck Scale	450.00
20 Ton Truck Scale	510.00
5 Ton Tipple Scale	312.00

Many types of conveyors.

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2190 S. Third St., Columbus 7, Ohio

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CALL WIRE WRITE CARLYLE

THE RUBBER HEADQUARTERS

CONVEYOR BELTING, TRANSMISSION BELTING, ELEVATOR BELTING, FIRE, WATER, AIR, STEAM, SUCTION and WELDING HOSE.

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

NEW GUARANTEED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom Covers
48"	8	1/8" — 1/16"
42"	5	1/8" — 1/16"
36"	6	1/8" — 1/16"
30"	6	1/8" — 1/16"
30"	5	1/8" — 1/16"
26"	5	1/8" — 1/32"
24"	5	1/8" — 1/32"
24"	4	1/8" — 1/32"
20"	5	1/8" — 1/32"
20"	4	1/8" — 1/32"
18"	4	1/8" — 1/32"
16"	4	1/8" — 1/32"
14"	4	1/16" — 1/32"
12"	4	1/16" — 1/32"

Inquire For Prices — Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

	Width	Ply	Width	Ply	Width	Ply
Inquire For Prices — Mention Size and Lengths.	18"	6	10"	6	6"	5
	16"	6	10"	5	5"	5
	14"	6	8"	6	4"	5
	12"	6	8"	5	4"	4
	12"	5	6"	6	3"	4

ENDLESS "V" BELTS

"A" Width All Sizes —
"B" Width All Sizes —
"C" Width All Sizes —
"D" Width All Sizes —
"E" Width All Sizes —

Sold in Matched Sets.
Inquire For Prices — Mention Size and Lengths.

SPECIAL OFFER . . . HEAVY DUTY RUBBER HOSE

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 Pair
¾"	25 "	7.50	1.50 Pair
	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
	50 "	20.00	1.50 Pair

LARGER SIZES ALSO AVAILABLE
All Prices—Net — F.O.B. New York

WATER HOSE

I.D. Size	Length	per Length
¾"	25 feet	$4.25
	50 "	8.00
1"	25 "	6.25
	50 "	12.50
1¼"	25 "	7.50
	35 "	10.50
	40 "	12.00
	50 "	15.00
1½"	25 "	10.00
	35 "	14.00
	50 "	20.00

Each Length with Couplings Attached

CARLYLE RUBBER CO., Inc.

62-66 PARK PLACE, NEW YORK 7, N. Y. Phone: BArclay 7-9793

NEW AC MOTORS

3/60/220/440 VOLTS

Quan.	HP	Speed	Remarks
4	½	1200	220 V.—T.E.
1	½	1800	T.E.N.V.
3	1	1200	T.E.
1	1	1200	X.P.
1	1	1800	220V.—X.P.
2	1½	1200	T.E.
2	1½	1800	T.E.
1	1½	1800	X.P.
2	1½	3600	T.E.
6	2	1200	T.E.F.C.
1	2	1800	X.P.
1	2	1800	Open
1	2	3600	T.E.
2	2	3600	T.E.F.C.
2	3	1200	X.P.
2	3	1800	T.E.F.C.
3	3	3600	T.E.F.C.
1	5	1200	X.P.
6	5	1200	T.E.F.C.
1	7½	1200	T.E.F.C.
1	7½	1200	X.P.

1/60/110/220 VOLTS

Quan.	HP	Speed	Remarks
7	1	1200	T.E.
3	1½	1800	X.P.
1	2	1200	Open
1	3	1800	Open

NEW GEAR MOTORS

3/60/220/440 VOLTS

Quan.	HP	Output RPM	Remarks
1	¼	96	440 V.—Open
1	1/3	72	440 V.—Open
1	½	86.2	Open
1	½	290	Open
1	1	45	Open
1	2	98.9	Open

1/60/110 VOLTS

Quan.	HP	Output RPM	Remarks
1	¼	72	Open

USED AC MOTORS

3/60/440 VOLTS

Quan.	HP	Speed	Remarks
1	2	1800	Open
1	2	1200	Open
2	5	1800	220/440 V.—Open
3	5	1200	Open
1	5	1200	220/440 V.—Open
1	10	1200	T.E.F.C.
1	10	1200	Open
1	10	1350/900	Enc.—Speedtrol
2	20	1200	Open
1	20	1200	220 V.—Open
1	25	850	Open
1	25	1200	Open
1	50	1200	220/440 V.—Open
1	50	1200	Open
1	125	1800	220 V.—Open

HEAT & POWER CO. INC.

70 Pine St. New York 5, N. Y.

DIGBY 8-0373

NEW MOTORS

In Stock—Immediate Shipment

3 — 5 — 7½ — 10 and 15 h.p.

1,200 and 1,800 r.p.m.

220/440 volts, 3ph., 60 cy., BALL BEARING, Type AR Allis-Chalmers Sq. Cage Induction Motors.

REBUILT ELECTRICAL EQUIPMENT

Motor-generator Sets and Rotary Converters Motors; Control; Transformers, etc.

R. H. Benney Equipment Co

5024 Montgomery Road, Norwood 12, Ohio

CONVEYOR BELTS ONE DAY SHIPMENT

1,675 ft. 36 in. 6 ply — New
1,120 ft. 36 in. 7 ply — Used
362 ft. 30 in. 6 ply — New
1,075 ft. 30 in. 5 ply — New
1,630 ft. 24 in. 5 ply — New
1,020 ft. 24 in. 4 ply — New
1,528 ft. 18 in. 4 ply — New

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60 E. 42nd St., New York, N. Y.
Tel. Mu. 2-0042

CRANES-MOTORS and ELECTRICAL EQUIPMENT

ENGINEERED AND REBUILT BY SPECIALISTS IN OUR MODERN PLANT

SYNCHRONOUS MOTORS
3 PHASE, 60 CYCLE

Qu.	H.P.	Make	P.F.	Volts	RPM.
1	30	Whse.	.8	220	1800
2	50	G.E.	.8	2200	660
1	60	G.E.	.8	440	1200
1	100	G.E.	.8	440	900
1	100	Whse.	1.0	2200	1200
1	125	Whse.	.8	220/440	1200
1	150	G.E.	.8	440	900
1	150	G.E.	1.0	2200	900
1	500	G.E.	.8	2200	720

CAN FURNISH ABOVE WITH EXCITERS, REDUCED VOLTAGE MAGNETIC OR SEMI-MAGNETIC OR FULL VOLTAGE MAGNETIC CONTROLLERS.

A. C. GENERATORS

Kva.	Make	P.F.	Volts	RPM.
25	Whse.	.8	220/127	1800
125	Whse.	.8	220/440	1200
200	C.W.	1.0	600	720
200	C.W.	.8	240	600

32 KW G.E. Frequency Converter, 220/3/60-Cy. to 110-V., 180-Cy.

SQUIRREL CAGE MOTORS
3 PHASE, 60 CYCLE

Qu.	HP.	Make	Type	Volts	RPM.
1	20	G.E.	IK	220	565
1	20	Whse.	CS	550	1740
8	20	Rel.	C504	440	
			1745/1150/875/570-RPM.		
2	25	Howell	M445	440	
			1770/1170/490-RPM.		
1	25	G.E.	KTR542	220	575
2	25	G.E.	KT332	220	865
1	25	G.E.	I-K	220	1200
1	30	Whse.	CS	550	900
1	35	G.E.	I-K	2200	1200
2	40	Al.Ch.	AR	440	860
2	40	F.M.	H12C	440	1200
1	40	Whse.	CS659A	2200	1760
1	50	G.E.	I-K	440	695
1	50	Whse.	CS	220	900
1	50	G.E.	KT536	440	1200
1	50	Ideal	AT445	440	1750
1	60	Whse.	CS607	440	800
1	75	Whse.	CS	440	1750
3	75	Al. Ch.	AR	2200	1765
1	100	G.E.	I-K	2300	695
5	100	F.M.	HS201C	440	880
2	100	Whse.	CS760	2300	1170
2	125	CW	126Q	440	430
2	125	Al. Ch.	AR	440	435
1	125	Whse.	CS761C	440	1800
3	125	Al. Ch.	AR	2200	1750
2	135	G.E.	KF542	440	1200
1	150	G.E.	I-K	2200	720
1	250	Whse.	CS	2200	1200

SLIP RING MOTORS
CONSTANT DUTY
3 PHASE, 60 CYCLE

Qu.	HP.	Make	Type	Volts	RPM.
2	5	Al. Ch.	ARY	220/440	720
2	10	G.E.	IM	220	1150
2	15	G.E.	IM	220	1150
1	20	G.E.	MT326	220	850
2	25	G.E.	MT332	550/2200	850
1	25	Al. Ch.	ARY	2200	860
4	25	G.E.	MT332	440	900
2	25	Whse.	CW481	440	1750
1	30	Al. Ch.	ARY	440	900
1	30	Whse.	CW	440	1160
1	40	Al. Ch.	ARY	550/2200	435
3	40	G.E.	MT346	550	560
1	40	Whse.	CW644	220	870
3*	40	G.E.	IM	600	1170
1	50	Al. Ch.	ARY	2200	490
2	50	G.E.	MT536	2200	1200
1	75	G.E.	MT548	440	1200
1	75	Al. Ch.	ARY	440	1750
1	100	G.E.	MT356	440	865
1	125	G.E.	MT558	2200	900
1	150	G.E.	IM	2200	1750
1**	200	G.E.	IM	2200	580
1	200	Whse.	CW873	440	1175
1	250	Whse.	CW1106	2200	580
1	300	G.E.	MT412	2200	360
1	300	Al. Ch.	ARY	2200	514
1	300	G.E.	IM	2200	1200
1	400	Whse.	CW1108	2300	500
1	400	Al. Ch.	ARY	550/2200	514
1	800	Al. Ch.	ARY	2200	440
1***1200		Whse.	CW	2200	590

*—40-Cycle. **—3-Bearing. ***—Mill Type.
Will supply with any of these motors Primary Control (O.C.B. or Mag.) Sec. Control, Drum or Mag., with necessary Resistance.

TRANSFORMERS
OIL COOLED

Qu.	K.V.A.	Make	Voltgae	Ph.	Cy.
3	25	Al. Ch.	2300/460/230	1	60
3	25	G.E.	2200/1100/608	1	40
3*	37½	Whse.	460/230-230/115	1	60
2	50	Wag.	13200/11880-575/287	1	60
1*	110	El. Fur.	2300/110/94/62/55	1	60
5	130	G.E.	1900/9500-550/2200	1	60
6	165/247	G.E.	38100/22000/11000-430/215	1	60
1	200	Whse.	3810/2200-440	3	60
3	300	Whse.	2400-480/240	1	60
1	500	G.E.	2400/240	3	60

*—Air-Cooled

MOTOR GENERATOR SETS
3 PHASE, 60 CYCLE

Qu.	KW.	Make	RPM.	D.C. V-lts	A.C. Volts
1	5½	G.E.	1800	250	440
1	9	G.E.	1800	250	440
1	15	Al. Ch.	1200	250	440
8	25	Whse.	1200	120/240	440
4	25	Whse.(3-U.)	1200	120/240	440/2200
2	35	G.E.	1800	125	440
1	50	Lo. Al.	1200	120/240	440
1	75	Whse.	1200	125	440
2	94	G.E.	1200	60	440
1	100	Al. Ch.	900	125	2300
1	150	Rel.	1200	250	2300/4100
1	200	G.E.	1200	250	2300/4000

3-U.—3-Unit Set.
ABOVE FURNISHED COMPLETE WITH D.C. PANELS AND A.C. CONTROL EQUIPMENT.

T. B. MAC CABE COMPANY.

4314 CLARISSA STREET — PHILADELPHIA, PENNA.

AIR COMPRESSORS:
12—Belted 360, 676, 870, 1000, 1300 ft.
12—Diesel 105, 315, 520, 676 & 1000 ft.
6—Electric 1300, 1500, 2200, 5000 ft.

CARS & LOCOMOTIVES:
65-Ton G. E. Diesel Elec. Locomotive.
100—50 ton cap. Gondolas.
35—50 ton cap. Flat Cars.
8—100-ton, 45-ton, 30-ton Diesel Locomotives.
6—10, 16, 20 & 30 ton Gas Locomotives.
150—8000 & 10000 gal. cap. Tank Cars.
20—12 yd. Std. ga. Steel Dump Cars.
1—50 ton G.E. Diesel Elec. Locomotive.

RUBBER CONVEYOR BELTS:
1000', 60", 600', 30", 300', 20", 1000', 42", 900', 48", 1450', 36", 1200', 24", 900', 18", 600', 16", 350', 14".

ELECTRIC LOCOMOTIVES:
15—3, 5, 8 ton Battery & Trolley.

DIESEL GENERATORS:
12—100, 150, 180 & 480 K.W.

MINE LOADERS:
17—GD9, Elmco 21, Conway 20, 50, 60 & 75 and Sullivan HL3.

STEEL TANKS:
6—50,000 and 100,000 gal. Tanks on tower.
30—8000, 10,000 and 20,000 gallon capacity.

SHOVELS—DRAGLINES:
7—1 yd., 1½ and 2 yd. Gas & Diesels.
16 yd. Elec. 160 ft. Boom Dragline.

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60 E. 42nd Street — New York 17, N. Y.

ONE MYERS WHALEY LOADING MACHINE

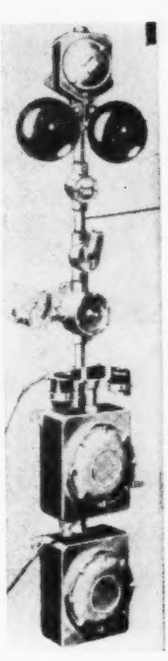
Special for heavy rock loading.

Guyan Machinery Company
Logan — West Virigina

AIR COMPRESSORS

2—175 CFM Inger. Rand 2 cyl. vert. 150 P.S.I. Type XIV dir. con. to G.E. 50 HP DC motor, 230 V. 400 RPM. Mounted on factory cast iron base. Complete with intercooler, unloader and access.

PHILADELPHIA TRANSFORMER CO.
Box 566 — Dalton, Pa.



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MODEL ETB-24 ..... $100.00

FOB Chicago

Also

BROOKS LOAD LUGGERS
DEMPSTER DUMPSTERS

Good Used Condition at Fraction of New Price

GENERAL TRADERS

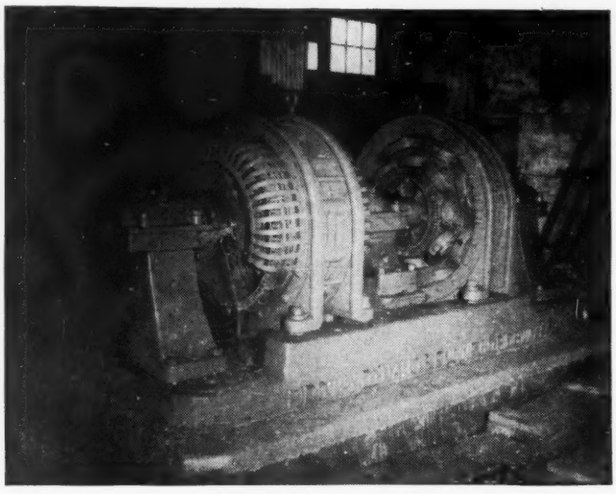
2675 West Grand Ave. — **Chicago 12, Ill.**

COMPLETE LIQUIDATION

IMMEDIATE DELIVERY

... Three and one-half million dollars in new and nearly new coal mining machinery and equipment

Jeffrey Arcwall 29 L-E Mining Machine



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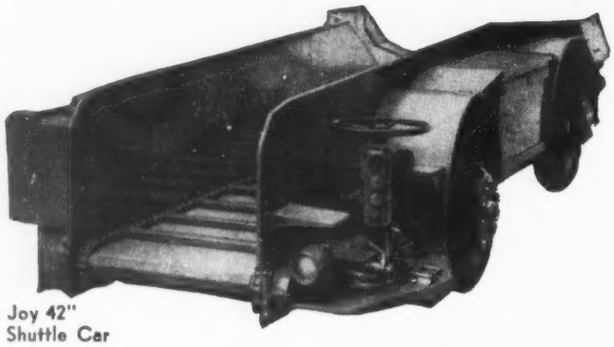
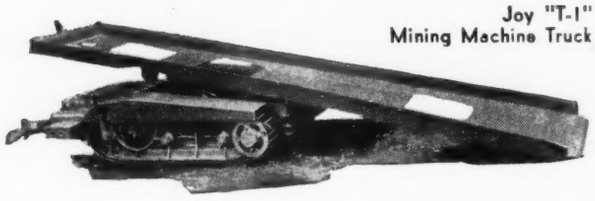
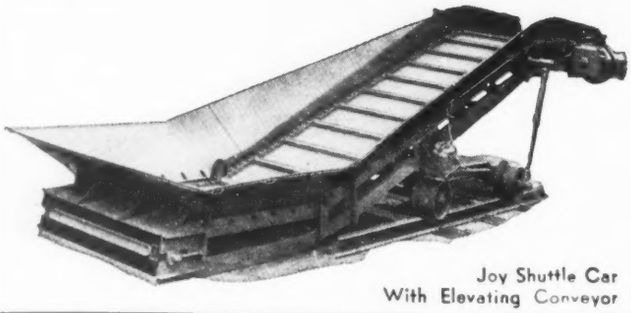


Joy 42" Shuttle Car

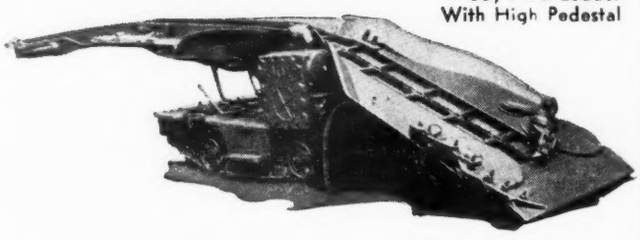
Joy "T-1" Mining Machine Truck





Joy Shuttle Car With Elevating Conveyor

Joy 7-BU Loader With High Pedestal



WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

Subsidiary of
Portland Equipment Co.
11 Broadway, New York 4, N. Y.

THE COLUMBINE MINE EQUIPMENT CO., INC.

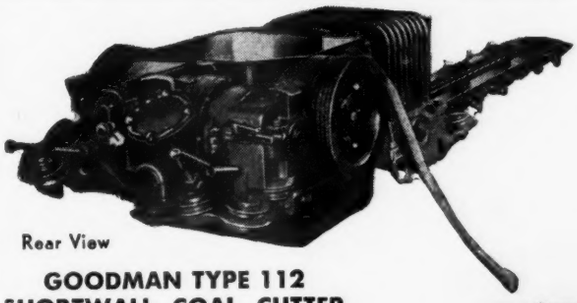
1669 BROADWAY, DENVER 2, COLORADO

SEE PAGE 213 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

COMPLETE LIQUIDATION

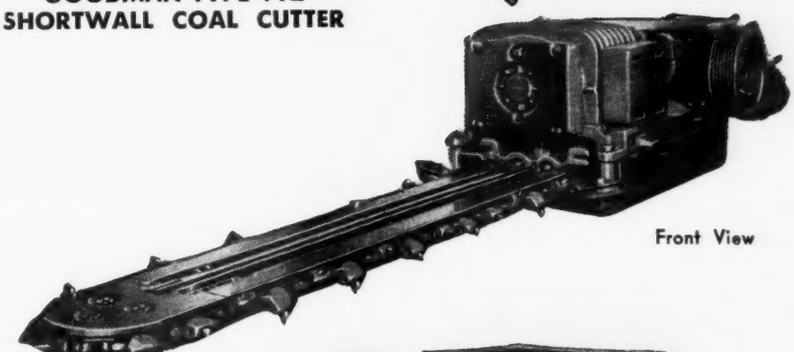
IMMEDIATE DELIVERY

. . . Three and one-half million dollars in new and nearly new coal mining machinery and equipment

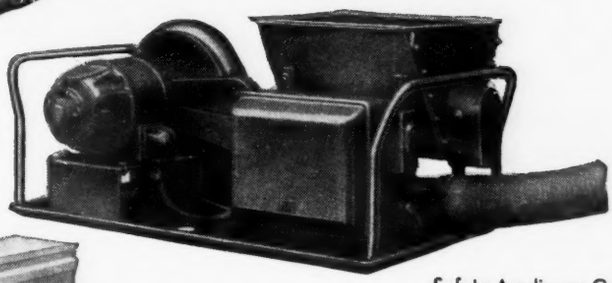


Rear View

GOODMAN TYPE 112 SHORTWALL COAL CUTTER



Front View



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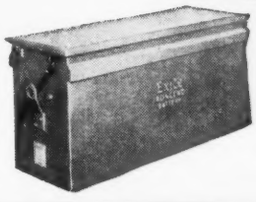

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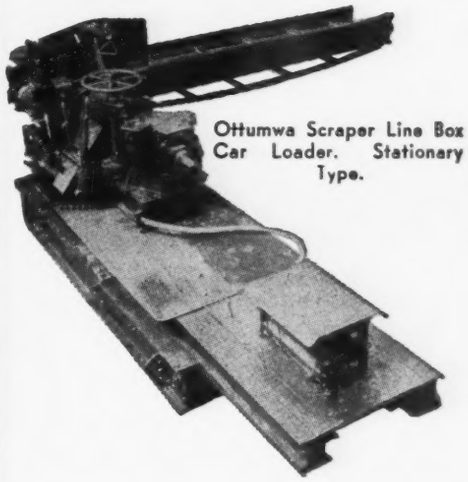

Ottumwa Scraper Line Box Car Loader. Stationary Type.

Partial View of Tipple with Grizzlies and Picking Screen.

Complete Cardox Plant, 160 Shell Capacity

TIPPLE CARS, 2 Ton Capacity, 36" Gauge End Dump, Roller and Ball Bearing.

ROTARY CAR DUMPER for 36" Cars With Automatic Control.

HOISTS—1 Double Drum Conical Hoist—Denver Engineering Works—300 HP., Silent Chain Drive, Complete With All Panelboards, Transformers and Controllers and Numerous Others.

THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY **DENVER 2, COLORADO**

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

SEE PAGE 213 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

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In Galveston Bay, huge rotary drilling rigs bore nine thousand feet under the sea for oil. Long strings of pipe put tremendous shock loads on wire rope. TRU-LAY Preformed stands up extremely well even under such treatment.

Breaking up hard-packed earth is the first step in grading for water drainage in Nebraska. These earth-breaking machines put constant gruelling strains on the wire rope. Here again, TRU-LAY Preformed gives longer, lower cost service.

ALL AROUND AMERICA

Hoisting a completely loaded box car onto a Seatrain for over-water journey from Edgewater, N. J., to Texas City. TRU-LAY Preformed is hard at work every day on thousands of huge overhead traveling cranes like these—giving good service.

Far down below ground in West Virginia's soft coal fields, under-cutting machines claw at the walls of coal. Here wire rope is expendable. TRU-LAY Preformed of correct construction adds many extra hours of service—lowers over-all costs.

ACCO

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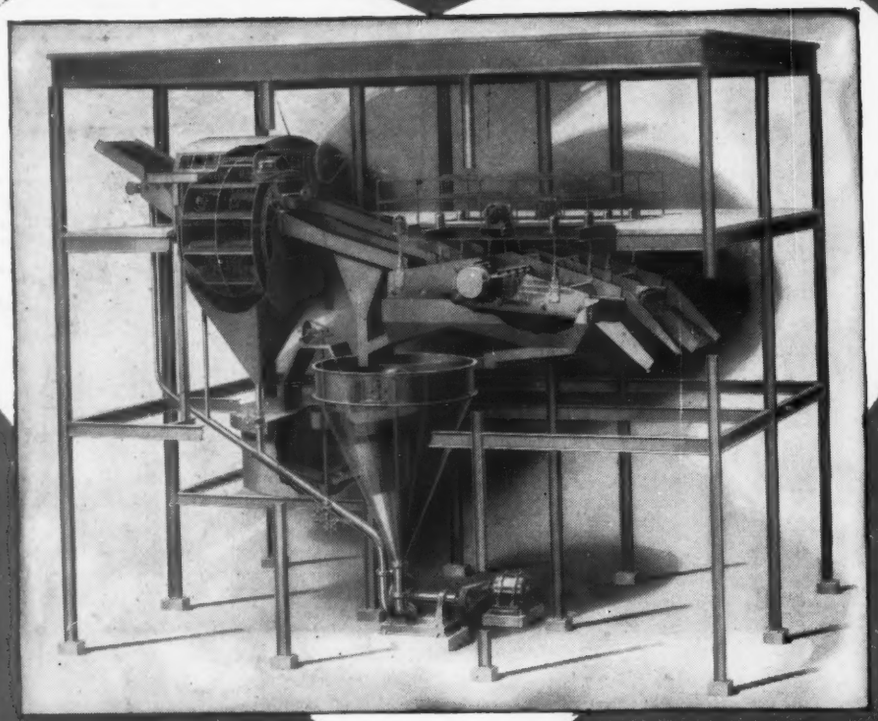
AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

Tru-Lay *Preformed* **Wire Rope**

The New
LINK-BELT Float-Sink Concentrator



The drawing above shows the concentrator, flumes, vibrating screens, thickener, sump, media circulating pump and storage cone. The complete magnetite reclamation circuit is illustrated and described in Link-Belt Book No. 2101.

Float-Sink test as applied by a laboratory technician to separate materials of different specific gravities. With the Heavy-Media system, the liquid is a suspension of magnetite in water.

Part of Link-Belt Float-Sink equipment in cleaning plant of large coal operator. The structure with windows, is the housing on the top of the Float-Sink Concentrator. The densifier is shown in the upper right hand portion of the picture.

The "Heart" of Heavy-Media*

The Link-Belt Float-Sink cleaning method has been in use for considerable time, with results so satisfactory that contracts have been made to install it in a number of other coal mining operations.

It cuts coal cleaning costs by making sharp separations at predetermined and stable specific gravities of medium with the range extending as low as 1.25 . . . it produces a clean float with a minimum of sink material or rejects, and a clean sink with a minimum of float material . . . handles large coal, reducing the necessity for manual picking . . . requires only one operator . . . has low operating and maintenance cost; low capital investment.

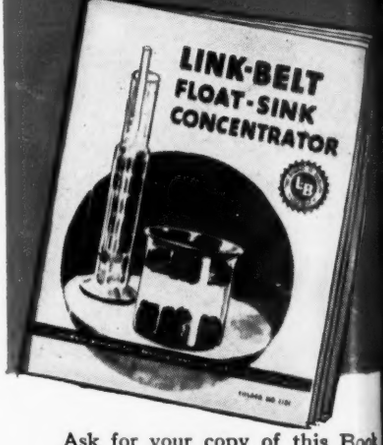
The heart of the Heavy-Media System is the Link-Belt Float-Sink Concentrator, consisting essentially of a drum-shaped tank to contain the liquid media and a rotating elevator with perforated lifter shelves that deliver the sink material to a flume. Liquid media are used to flume the float material to a vibrating screen. We invite the coal mining industry to take advantage of our experience on Heavy-Media and other cleaning methods.

*The Heavy-Media Separation Processes are licensed by the American Zinc, Lead and Smelting Company. American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y. are their sole Technical and Sales Representatives for these processes.

11,028

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.



Ask for your copy of this Book No. 2101 illustrating the Link-Belt Float-Sink Concentrator and Heavy-Media method of cleaning.

COAL PREPARATION AND HANDLING EQUIPMENT

Engineered, Built and Backed by LINK-BELT